

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA895TD

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

FEATURES

- Built-in low phase distortion transistor suited for OSC applications
 $f_T = 4.5 \text{ GHz TYP.}$, $|S_{21e}|^2 = 4.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_C = 5 \text{ mA, } f = 2 \text{ GHz}$
- Built-in 2 transistors ($2 \times 2\text{SC}5800$)
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

	Q1, Q2
3-pin thin-type ultra super minimold part No.	2SC5800

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA873TD	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 PA873TD-T3	10 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.
The 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 Compound Semiconductor Devices 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}	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	mW
		210 in 2 elements	
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 PCB

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

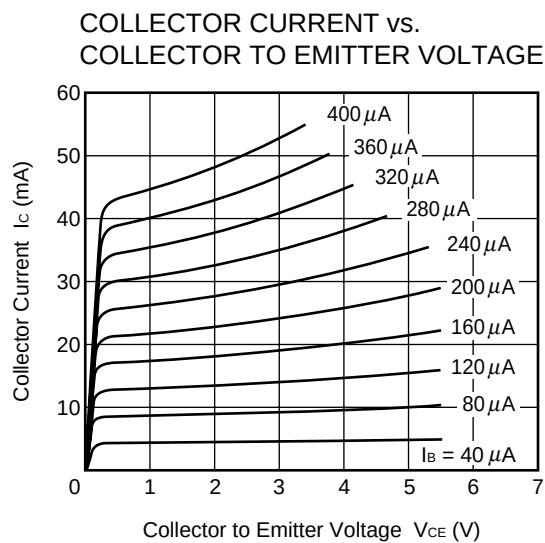
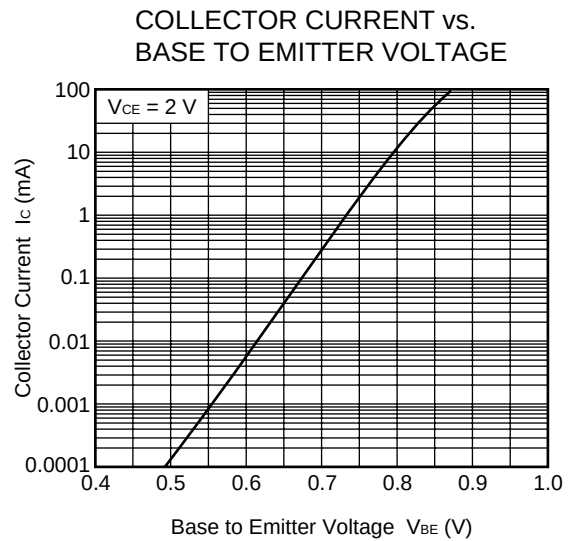
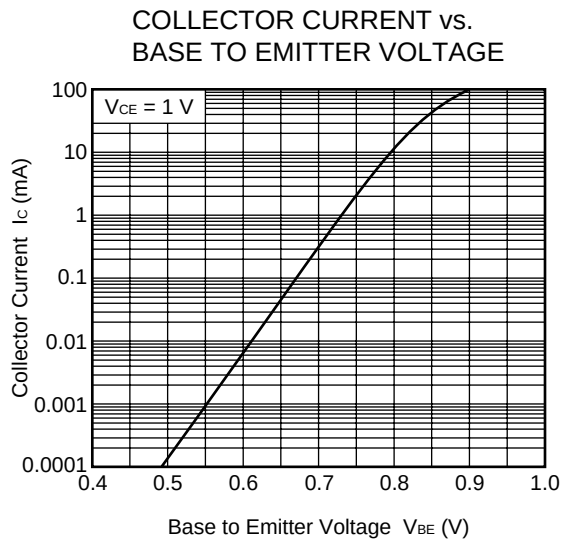
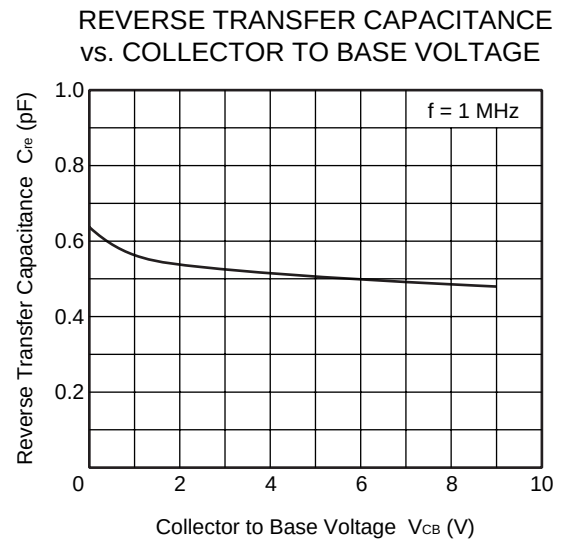
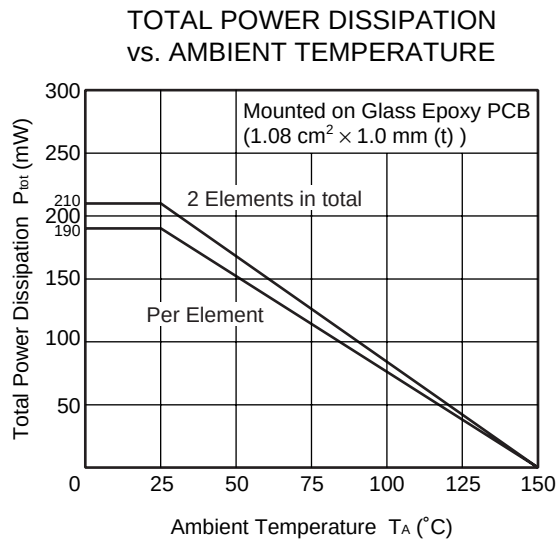
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	–	–	600	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 mA	–	–	600	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 5 mA	100	120	145	–
Gain Bandwidth Product (1)	f _T	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	3.0	4.5	–	GHz
Gain Bandwidth Product (2)	f _T	V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz	5.0	6.5	–	GHz
Insertion Power Gain (1)	S _{21e} ²	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	3.0	4.0	–	dB
Insertion Power Gain (2)	S _{21e} ²	V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz	4.5	5.5	–	dB
Noise Figure	NF	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.9	2.5	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz	–	0.6	0.8	pF

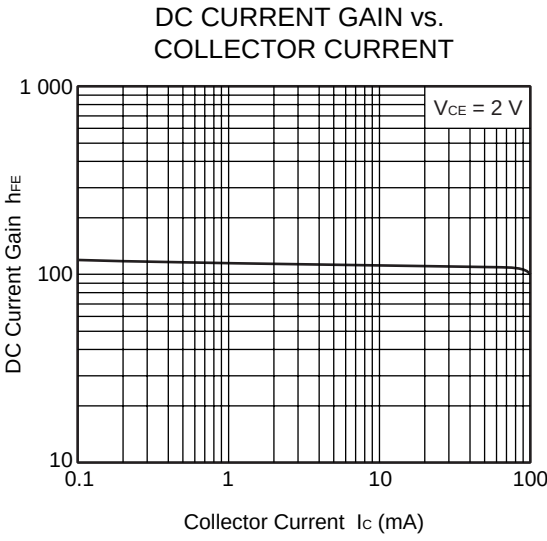
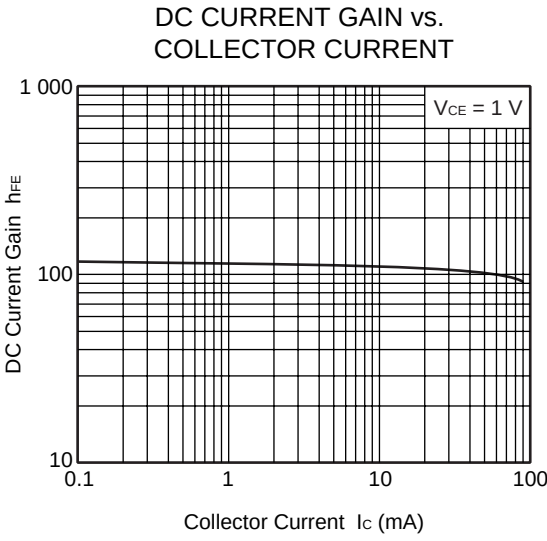
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

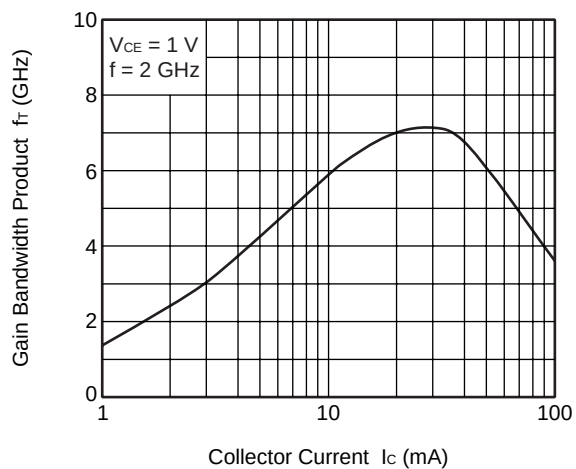
Rank	FB
Marking	kP
h _{FE} Value	100 to 145

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

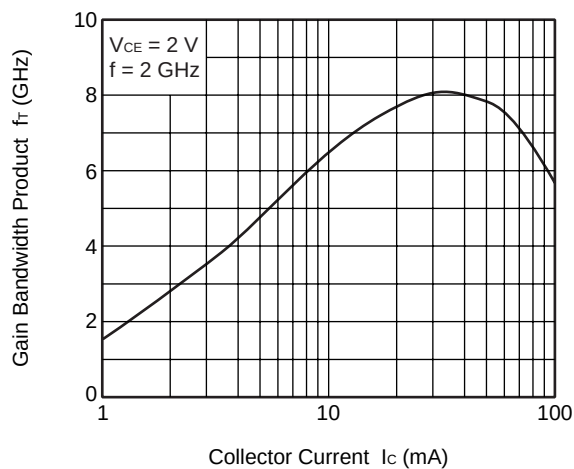




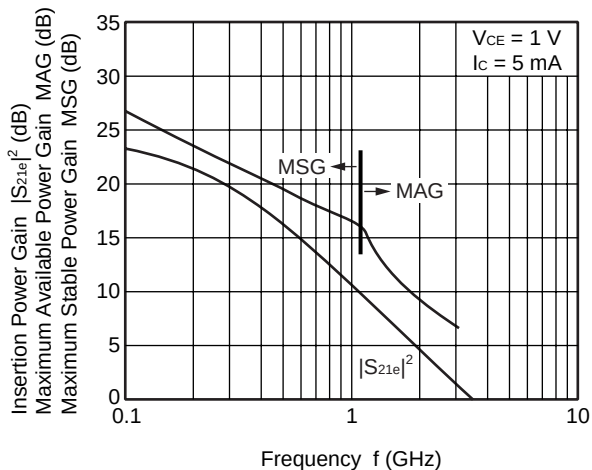
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



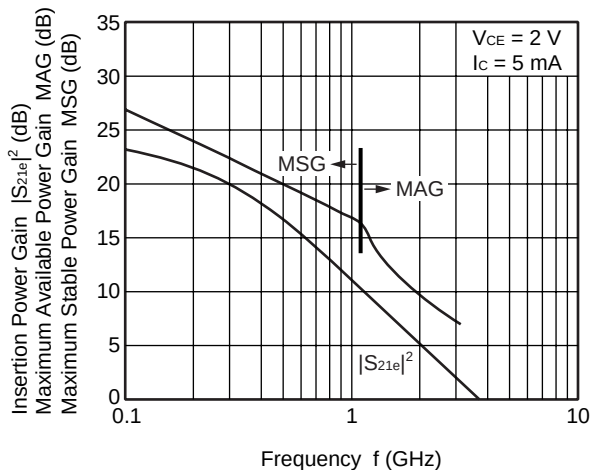
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



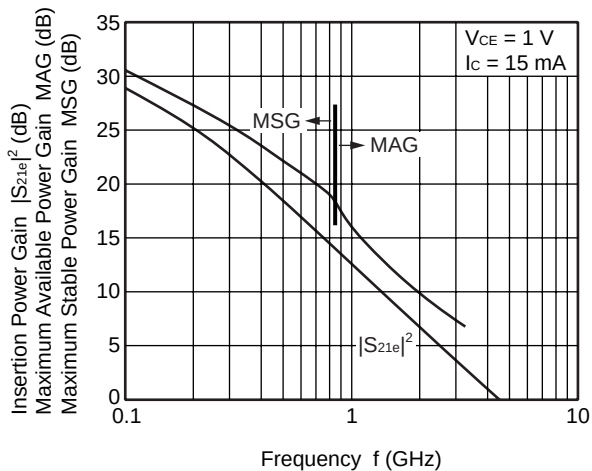
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



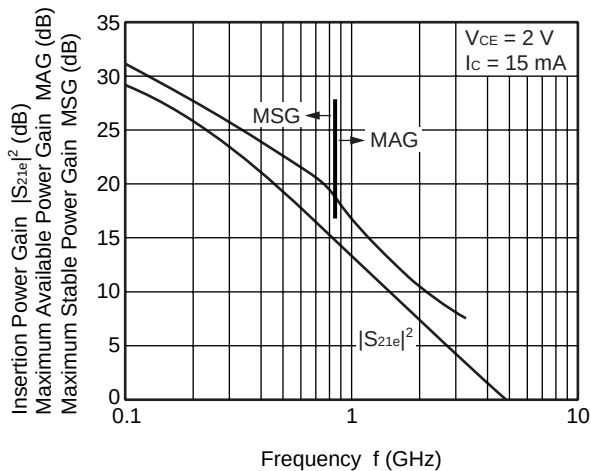
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



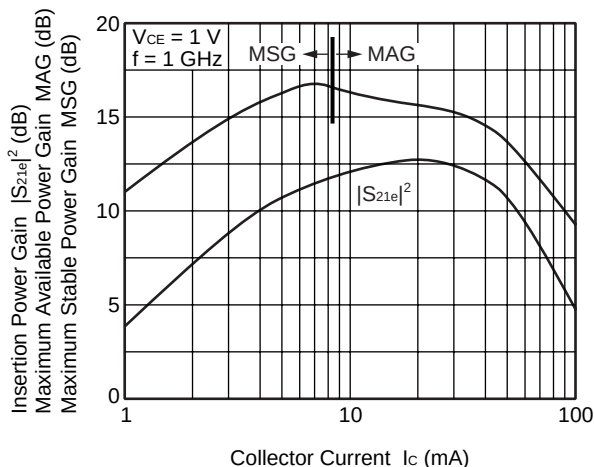
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



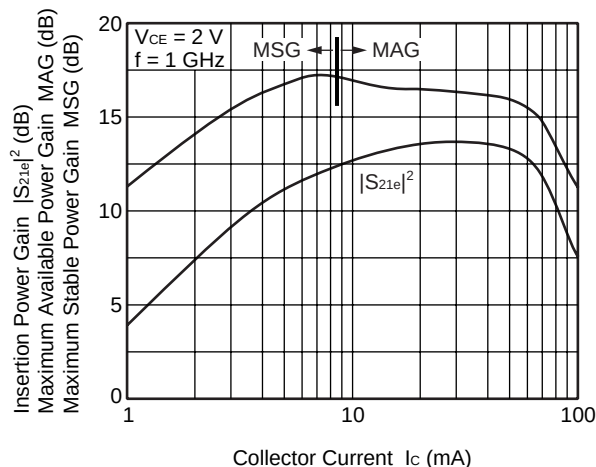
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



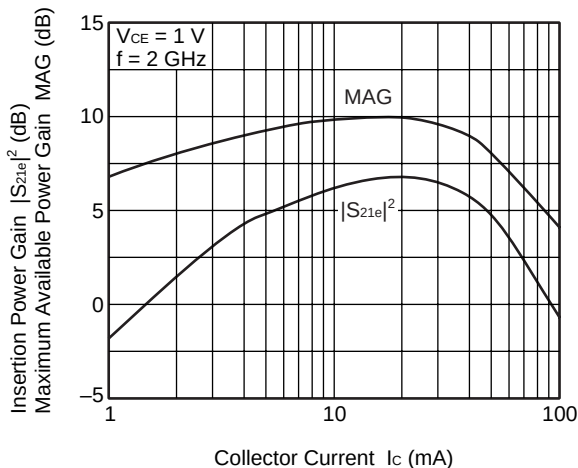
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



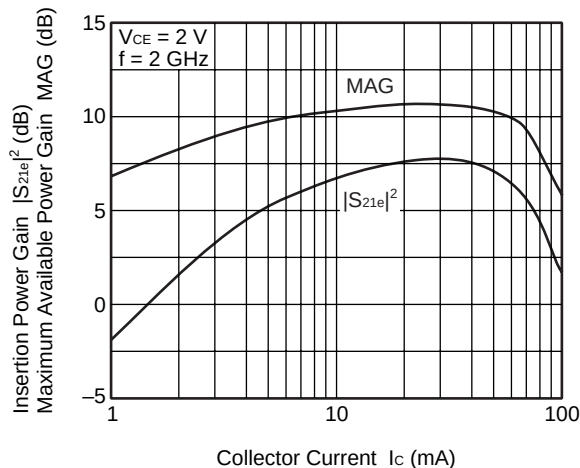
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



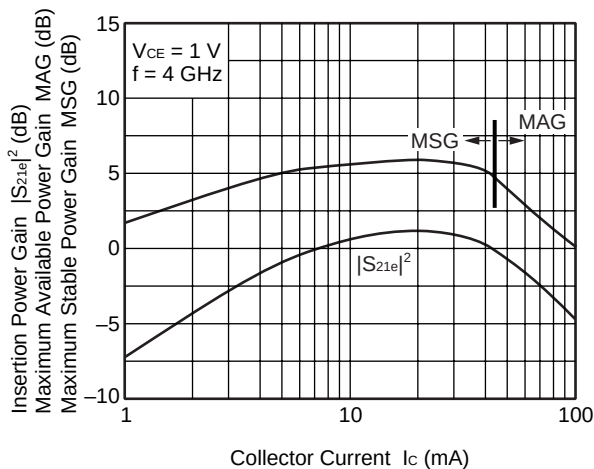
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



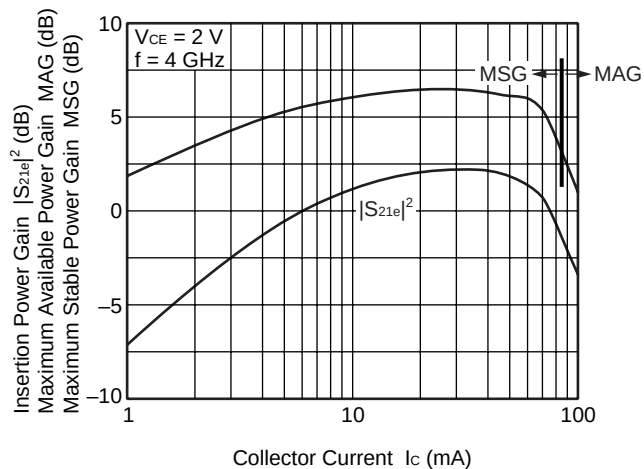
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



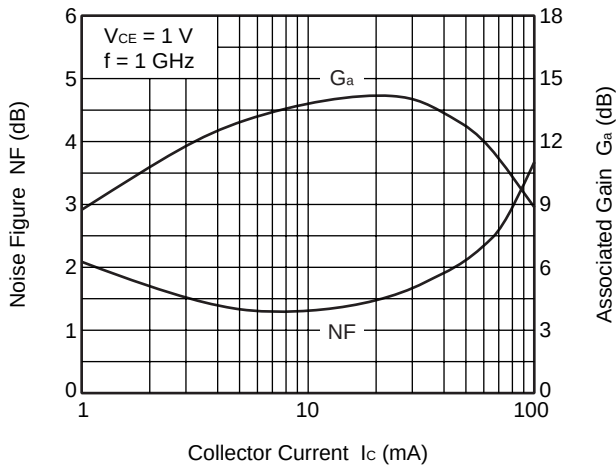
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



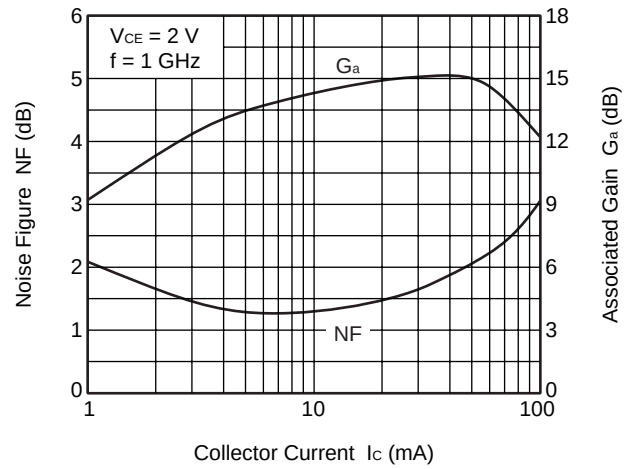
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



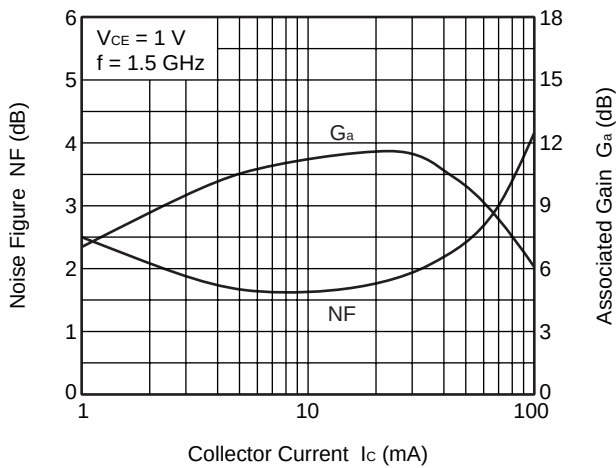
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



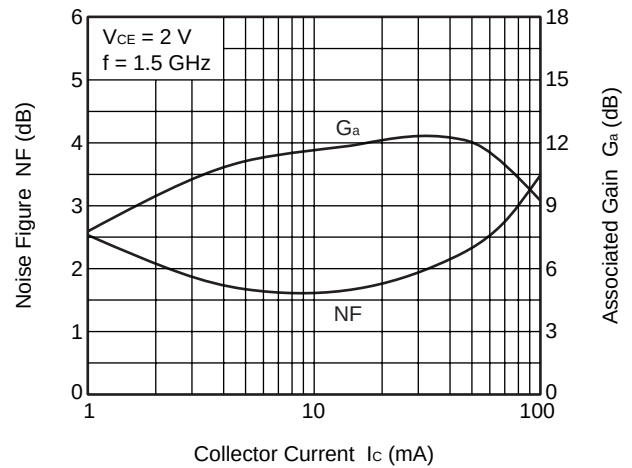
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



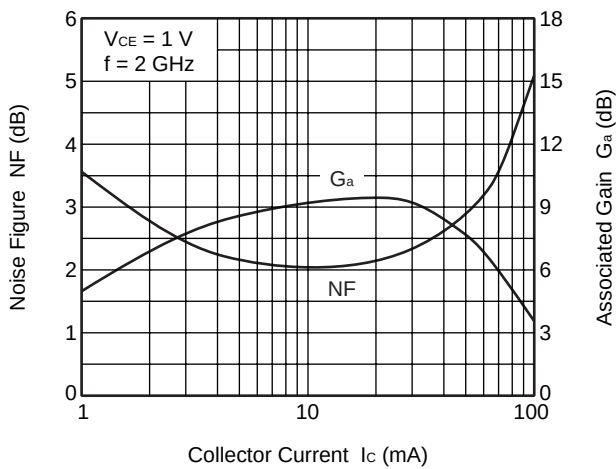
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



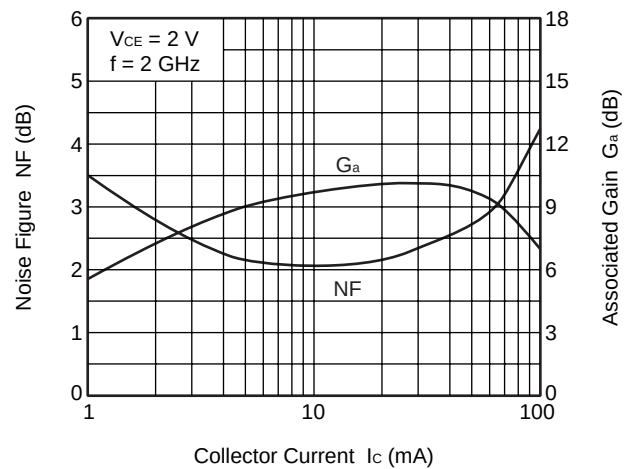
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

V_{CE} = 1 V, I_C = 1 mA, Z₀ = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.965	-24.1	3.654	164.3	0.035	77.0	0.985	-6.8
0.2	0.935	-46.4	3.467	149.7	0.068	63.9	0.947	-13.4
0.3	0.904	-66.0	3.152	137.5	0.091	52.8	0.901	-18.9
0.4	0.876	-83.9	2.849	125.4	0.109	43.5	0.850	-23.4
0.5	0.848	-99.0	2.549	115.8	0.120	35.6	0.807	-27.0
0.6	0.826	-111.8	2.286	107.5	0.126	29.4	0.768	-30.3
0.7	0.812	-122.4	2.062	100.2	0.128	24.0	0.740	-33.3
0.8	0.801	-131.7	1.875	93.3	0.128	19.7	0.715	-36.3
0.9	0.793	-139.5	1.703	87.5	0.126	16.0	0.696	-39.3
1.0	0.789	-146.6	1.561	82.0	0.123	13.1	0.679	-42.7
1.1	0.786	-152.5	1.434	77.0	0.117	10.9	0.669	-45.9
1.2	0.780	-157.9	1.323	72.2	0.112	9.3	0.662	-49.2
1.3	0.784	-162.3	1.227	68.4	0.105	8.3	0.656	-52.7
1.4	0.784	-166.8	1.147	64.2	0.099	8.1	0.650	-56.2
1.5	0.791	-170.3	1.077	60.7	0.092	9.0	0.649	-59.8
1.6	0.792	-173.4	1.006	57.4	0.085	10.6	0.646	-63.3
1.7	0.795	-176.4	0.951	54.2	0.079	13.6	0.648	-66.9
1.8	0.795	-179.4	0.895	51.1	0.072	18.2	0.647	-70.5
1.9	0.798	178.0	0.850	48.8	0.067	24.7	0.647	-74.0
2.0	0.802	175.4	0.809	45.9	0.065	32.5	0.648	-77.6
2.1	0.805	173.3	0.768	43.8	0.063	41.4	0.648	-81.2
2.2	0.810	171.1	0.735	41.2	0.065	50.5	0.649	-84.9
2.3	0.809	169.0	0.708	39.7	0.070	58.7	0.648	-88.6
2.4	0.810	167.0	0.677	38.1	0.077	65.6	0.648	-92.5
2.5	0.810	164.8	0.650	36.5	0.086	71.0	0.651	-96.5
2.6	0.810	162.9	0.630	35.5	0.096	74.9	0.654	-100.6
2.7	0.813	160.6	0.607	34.2	0.108	77.3	0.654	-104.5
2.8	0.817	158.7	0.583	33.0	0.120	78.7	0.660	-108.2
2.9	0.811	157.0	0.558	32.5	0.134	79.1	0.661	-111.8
3.0	0.812	154.7	0.536	31.5	0.148	79.1	0.655	-115.8
4.0	0.816	133.9	0.435	25.9	0.294	67.7	0.679	-153.2
5.0	0.808	121.8	0.434	22.1	0.396	42.5	0.634	166.5

V_{CE} = 1 V, I_C = 3 mA, Z₀ = 50 Ω

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.885	-35.2	9.632	157.9	0.035	72.0	0.949	-13.6
0.2	0.835	-65.4	8.466	139.8	0.060	56.9	0.843	-24.6
0.3	0.786	-88.2	7.146	126.3	0.075	45.9	0.738	-31.8
0.4	0.753	-107.2	6.038	114.9	0.083	38.6	0.649	-36.5
0.5	0.722	-121.5	5.142	106.5	0.088	33.6	0.584	-39.5
0.6	0.706	-133.1	4.463	99.6	0.090	30.4	0.535	-41.9
0.7	0.698	-142.0	3.918	93.8	0.091	28.3	0.499	-44.1
0.8	0.693	-149.6	3.488	88.4	0.091	27.3	0.470	-46.3
0.9	0.692	-155.9	3.124	84.1	0.090	26.7	0.449	-48.6
1.0	0.688	-161.5	2.836	79.7	0.090	27.1	0.432	-51.3
1.1	0.689	-165.9	2.585	76.0	0.088	28.1	0.421	-54.1
1.2	0.688	-170.1	2.374	72.2	0.087	29.5	0.413	-56.8
1.3	0.694	-173.5	2.197	69.1	0.086	31.3	0.408	-59.9
1.4	0.694	-177.0	2.044	66.0	0.085	33.7	0.404	-63.0
1.5	0.703	-179.4	1.912	63.0	0.086	36.8	0.403	-66.2
1.6	0.705	178.2	1.794	60.0	0.086	39.6	0.402	-69.4
1.7	0.708	176.0	1.692	57.3	0.087	43.0	0.403	-72.6
1.8	0.710	173.8	1.597	54.6	0.089	46.6	0.403	-75.8
1.9	0.713	171.8	1.515	52.3	0.091	50.1	0.404	-78.9
2.0	0.717	169.9	1.441	49.8	0.095	53.4	0.405	-82.3
2.1	0.723	168.4	1.375	47.6	0.099	56.6	0.407	-85.7
2.2	0.725	166.8	1.318	45.0	0.105	59.3	0.409	-89.1
2.3	0.725	165.0	1.274	43.2	0.110	61.8	0.412	-92.5
2.4	0.729	163.4	1.219	41.5	0.118	63.8	0.414	-96.1
2.5	0.731	161.7	1.175	39.4	0.125	65.6	0.418	-99.8
2.6	0.733	160.2	1.136	37.8	0.133	67.1	0.421	-103.6
2.7	0.736	158.4	1.100	36.0	0.142	68.0	0.427	-107.4
2.8	0.741	156.9	1.057	34.3	0.151	68.6	0.433	-110.9
2.9	0.737	155.5	1.020	32.9	0.161	68.6	0.438	-114.5
3.0	0.738	153.3	0.975	31.0	0.172	68.7	0.440	-118.2
4.0	0.769	135.3	0.730	15.3	0.286	62.1	0.509	-153.5
5.0	0.796	123.5	0.577	7.2	0.381	41.4	0.526	167.1

$V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.830	-44.6	14.560	152.7	0.032	68.1	0.908	-19.6
0.2	0.756	-79.1	11.937	132.3	0.053	52.8	0.749	-33.2
0.3	0.711	-103.5	9.559	119.1	0.063	43.4	0.617	-40.9
0.4	0.680	-121.8	7.781	108.6	0.069	38.4	0.520	-45.1
0.5	0.660	-134.7	6.481	101.2	0.072	36.0	0.454	-47.8
0.6	0.651	-144.9	5.542	95.2	0.074	35.1	0.406	-49.8
0.7	0.647	-152.5	4.815	90.3	0.076	34.8	0.372	-51.6
0.8	0.647	-159.1	4.262	85.6	0.077	35.6	0.345	-53.7
0.9	0.648	-164.5	3.801	81.9	0.079	36.8	0.326	-56.0
1.0	0.648	-169.0	3.439	78.1	0.080	38.3	0.311	-58.6
1.1	0.648	-172.8	3.130	74.9	0.081	40.2	0.302	-61.3
1.2	0.650	-176.4	2.865	71.7	0.083	42.1	0.294	-64.3
1.3	0.656	-179.0	2.653	68.8	0.085	44.2	0.290	-67.3
1.4	0.659	178.1	2.466	66.0	0.088	46.6	0.287	-70.4
1.5	0.667	175.8	2.308	63.4	0.091	48.8	0.286	-73.6
1.6	0.668	173.8	2.164	60.8	0.094	50.9	0.286	-76.8
1.7	0.673	172.1	2.038	58.3	0.098	52.9	0.288	-79.9
1.8	0.674	170.3	1.925	55.8	0.102	55.2	0.288	-83.0
1.9	0.678	168.7	1.828	53.7	0.107	57.1	0.290	-86.1
2.0	0.682	166.9	1.741	51.3	0.112	58.7	0.291	-89.5
2.1	0.685	165.5	1.660	49.3	0.118	60.2	0.294	-92.7
2.2	0.689	164.2	1.594	46.9	0.123	61.6	0.297	-96.1
2.3	0.691	162.6	1.540	45.2	0.130	62.7	0.299	-99.4
2.4	0.694	161.3	1.477	43.4	0.137	63.5	0.302	-102.9
2.5	0.696	159.9	1.423	41.4	0.144	64.3	0.307	-106.6
2.6	0.699	158.5	1.379	39.8	0.151	65.0	0.312	-110.2
2.7	0.701	156.9	1.334	38.0	0.160	65.0	0.317	-113.8
2.8	0.706	155.5	1.286	36.2	0.168	65.2	0.324	-117.3
2.9	0.703	154.4	1.240	34.9	0.177	64.9	0.330	-120.7
3.0	0.703	152.4	1.191	32.9	0.186	64.8	0.335	-124.3
4.0	0.743	135.5	0.893	15.4	0.286	58.7	0.418	-157.4
5.0	0.783	124.6	0.691	4.4	0.373	40.2	0.462	164.9

$V_{CE} = 1\text{ V}$, $I_C = 7\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.776	-53.0	18.356	148.5	0.031	67.4	0.869	-24.3
0.2	0.701	-90.0	14.204	127.3	0.048	50.5	0.676	-39.5
0.3	0.661	-114.1	10.997	114.4	0.055	43.0	0.535	-47.1
0.4	0.643	-131.0	8.762	104.8	0.060	40.1	0.439	-51.3
0.5	0.627	-143.1	7.220	98.1	0.064	39.0	0.376	-53.7
0.6	0.623	-151.8	6.127	92.7	0.066	39.7	0.331	-55.7
0.7	0.623	-158.8	5.301	88.3	0.069	40.5	0.300	-57.6
0.8	0.624	-164.8	4.674	84.1	0.071	42.1	0.275	-59.8
0.9	0.627	-169.2	4.154	80.7	0.074	43.6	0.258	-62.4
1.0	0.629	-173.3	3.752	77.2	0.077	45.5	0.245	-65.3
1.1	0.630	-176.6	3.418	74.2	0.080	47.4	0.236	-68.4
1.2	0.631	-179.9	3.132	71.3	0.084	49.3	0.230	-71.5
1.3	0.639	177.9	2.893	68.7	0.087	51.0	0.227	-74.8
1.4	0.640	175.2	2.691	66.1	0.091	52.8	0.225	-78.1
1.5	0.649	173.3	2.520	63.6	0.096	54.5	0.225	-81.3
1.6	0.652	171.4	2.362	61.2	0.100	56.0	0.225	-84.7
1.7	0.655	169.8	2.224	58.8	0.105	57.3	0.227	-87.7
1.8	0.657	168.3	2.103	56.4	0.110	58.9	0.228	-90.9
1.9	0.660	166.6	1.996	54.6	0.116	60.0	0.230	-93.9
2.0	0.664	165.0	1.900	52.2	0.122	61.0	0.232	-97.3
2.1	0.667	163.9	1.814	50.2	0.128	61.8	0.235	-100.5
2.2	0.673	162.6	1.740	47.9	0.134	62.5	0.238	-103.9
2.3	0.675	161.2	1.684	46.3	0.141	63.0	0.241	-107.1
2.4	0.675	160.0	1.616	44.4	0.148	63.4	0.244	-110.7
2.5	0.680	158.6	1.554	42.6	0.155	63.8	0.250	-114.2
2.6	0.679	157.3	1.506	41.1	0.162	64.1	0.255	-117.5
2.7	0.686	155.9	1.461	39.3	0.170	63.9	0.262	-121.3
2.8	0.687	154.5	1.409	37.5	0.178	63.8	0.269	-124.5
2.9	0.685	153.5	1.360	36.1	0.187	63.3	0.276	-127.8
3.0	0.685	151.8	1.308	34.1	0.195	62.9	0.281	-131.1
4.0	0.726	135.7	0.987	16.4	0.287	56.6	0.371	-162.0
5.0	0.774	125.2	0.762	4.0	0.369	39.2	0.425	162.1

$V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.708	-63.2	22.952	143.0	0.028	63.3	0.812	-30.6
0.2	0.647	-104.2	16.597	121.5	0.042	49.2	0.587	-47.2
0.3	0.617	-126.0	12.376	109.5	0.048	44.0	0.444	-54.7
0.4	0.605	-141.2	9.676	100.9	0.052	43.3	0.355	-59.0
0.5	0.600	-151.8	7.899	95.0	0.056	44.1	0.298	-61.6
0.6	0.600	-159.5	6.665	90.2	0.060	46.1	0.258	-64.1
0.7	0.601	-165.4	5.746	86.2	0.064	47.5	0.230	-66.4
0.8	0.604	-170.5	5.055	82.4	0.068	49.6	0.209	-69.4
0.9	0.610	-174.3	4.489	79.4	0.072	51.2	0.194	-72.6
1.0	0.612	-177.8	4.048	76.2	0.077	52.9	0.183	-76.3
1.1	0.615	179.3	3.674	73.5	0.081	54.4	0.177	-80.1
1.2	0.615	176.5	3.369	70.9	0.086	55.8	0.172	-83.9
1.3	0.625	174.4	3.114	68.4	0.091	57.2	0.171	-87.7
1.4	0.628	172.0	2.897	66.1	0.096	58.4	0.170	-91.3
1.5	0.634	170.5	2.709	63.7	0.102	59.3	0.171	-94.7
1.6	0.638	169.1	2.540	61.3	0.107	60.3	0.172	-98.2
1.7	0.640	167.4	2.398	59.1	0.113	61.0	0.175	-101.3
1.8	0.642	166.0	2.264	56.9	0.119	61.9	0.177	-104.5
1.9	0.647	164.5	2.149	55.1	0.125	62.4	0.180	-107.4
2.0	0.650	163.2	2.046	53.0	0.131	62.8	0.182	-110.7
2.1	0.653	162.0	1.955	51.1	0.138	63.2	0.186	-113.8
2.2	0.658	161.0	1.875	48.8	0.145	63.4	0.189	-117.2
2.3	0.657	159.7	1.811	47.3	0.151	63.5	0.194	-120.2
2.4	0.660	158.5	1.740	45.5	0.159	63.4	0.197	-123.5
2.5	0.662	157.2	1.678	43.6	0.166	63.4	0.204	-126.8
2.6	0.665	156.0	1.626	42.3	0.173	63.4	0.210	-130.0
2.7	0.669	154.7	1.574	40.5	0.181	62.9	0.216	-133.3
2.8	0.671	153.6	1.516	38.7	0.188	62.6	0.224	-136.2
2.9	0.668	152.6	1.468	37.3	0.197	61.9	0.231	-139.2
3.0	0.670	150.6	1.413	35.5	0.205	61.4	0.238	-142.0
4.0	0.711	135.4	1.073	17.5	0.291	54.4	0.332	-169.0
5.0	0.765	125.5	0.831	4.3	0.366	38.1	0.393	157.6

$V_{CE} = 1\text{ V}$, $I_C = 15\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.637	-77.8	27.758	136.7	0.026	59.3	0.736	-38.4
0.2	0.595	-119.1	18.601	115.7	0.036	49.6	0.490	-56.1
0.3	0.584	-138.5	13.462	104.8	0.041	46.9	0.356	-63.9
0.4	0.582	-151.3	10.360	97.3	0.046	48.3	0.279	-68.8
0.5	0.583	-160.0	8.401	92.2	0.051	50.6	0.229	-72.3
0.6	0.585	-166.6	7.049	87.9	0.056	53.0	0.195	-76.1
0.7	0.591	-171.3	6.066	84.4	0.061	54.9	0.172	-79.9
0.8	0.593	-175.8	5.308	80.9	0.067	56.6	0.155	-84.6
0.9	0.600	-178.8	4.716	78.3	0.072	57.8	0.144	-89.2
1.0	0.603	178.2	4.255	75.2	0.078	59.1	0.137	-94.5
1.1	0.606	175.6	3.864	72.8	0.083	60.4	0.134	-99.5
1.2	0.608	173.3	3.538	70.4	0.089	61.2	0.132	-104.2
1.3	0.615	171.4	3.272	68.1	0.095	61.9	0.133	-108.5
1.4	0.620	169.2	3.039	65.9	0.101	62.6	0.135	-112.3
1.5	0.628	168.0	2.842	63.6	0.108	63.0	0.138	-115.7
1.6	0.629	166.6	2.664	61.4	0.114	63.4	0.140	-119.1
1.7	0.631	165.0	2.513	59.4	0.120	63.7	0.144	-121.9
1.8	0.636	163.9	2.377	57.1	0.127	64.1	0.147	-125.0
1.9	0.638	162.6	2.253	55.4	0.133	64.2	0.150	-127.4
2.0	0.642	161.3	2.150	53.5	0.140	64.1	0.154	-130.4
2.1	0.644	160.3	2.050	51.6	0.147	64.1	0.158	-133.2
2.2	0.648	159.3	1.970	49.6	0.154	64.0	0.163	-136.0
2.3	0.651	158.1	1.902	47.9	0.161	63.8	0.167	-138.5
2.4	0.649	157.0	1.825	46.3	0.169	63.5	0.172	-141.5
2.5	0.653	155.9	1.760	44.4	0.176	63.2	0.178	-144.2
2.6	0.655	154.7	1.710	43.1	0.183	62.8	0.185	-146.7
2.7	0.658	153.4	1.653	41.4	0.191	62.2	0.192	-149.5
2.8	0.664	152.3	1.598	39.7	0.198	61.7	0.199	-151.7
2.9	0.659	151.3	1.544	38.3	0.206	60.8	0.208	-154.1
3.0	0.658	149.6	1.488	36.5	0.214	60.3	0.215	-156.2
4.0	0.701	135.1	1.134	18.8	0.295	52.6	0.308	-178.0
5.0	0.758	125.7	0.881	5.2	0.364	36.7	0.373	151.7

$V_{CE} = 1\text{ V}$, $I_C = 20\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.595	-90.1	30.614	132.0	0.023	57.3	0.670	-44.6
0.2	0.578	-129.8	19.508	111.8	0.032	50.6	0.424	-63.1
0.3	0.571	-147.1	13.843	101.9	0.037	49.8	0.301	-71.5
0.4	0.576	-158.0	10.586	95.1	0.043	52.9	0.232	-77.7
0.5	0.577	-165.5	8.543	90.4	0.048	55.1	0.189	-82.6
0.6	0.582	-170.9	7.163	86.4	0.055	57.3	0.161	-88.1
0.7	0.587	-174.9	6.145	83.1	0.060	59.2	0.143	-93.6
0.8	0.594	-178.7	5.390	79.8	0.067	60.7	0.130	-100.1
0.9	0.599	-178.4	4.783	77.4	0.073	61.4	0.123	-106.2
1.0	0.601	-175.5	4.308	74.6	0.079	62.6	0.120	-112.5
1.1	0.606	-173.3	3.913	72.3	0.085	63.4	0.120	-118.0
1.2	0.608	-171.2	3.584	69.9	0.092	63.8	0.121	-122.9
1.3	0.616	-169.5	3.312	67.7	0.098	64.3	0.124	-126.9
1.4	0.620	-167.6	3.075	65.6	0.105	64.6	0.127	-130.5
1.5	0.626	-166.2	2.876	63.4	0.112	64.8	0.131	-133.3
1.6	0.628	-165.0	2.698	61.3	0.118	65.0	0.135	-136.3
1.7	0.631	-163.7	2.545	59.2	0.125	64.9	0.139	-138.6
1.8	0.636	-162.5	2.404	57.1	0.132	65.1	0.143	-141.2
1.9	0.637	-161.1	2.282	55.4	0.139	65.0	0.146	-143.2
2.0	0.643	-160.0	2.174	53.5	0.146	64.7	0.151	-145.7
2.1	0.644	-159.2	2.075	51.8	0.153	64.6	0.155	-148.1
2.2	0.649	-158.1	1.994	49.6	0.160	64.2	0.160	-150.4
2.3	0.648	-157.0	1.927	48.1	0.167	63.9	0.165	-152.6
2.4	0.649	-156.0	1.850	46.5	0.175	63.4	0.170	-155.0
2.5	0.653	-154.8	1.783	44.6	0.182	62.9	0.177	-157.2
2.6	0.655	-153.7	1.730	43.3	0.189	62.6	0.183	-159.2
2.7	0.657	-152.5	1.674	41.6	0.197	61.8	0.190	-161.3
2.8	0.660	-151.4	1.619	39.9	0.205	61.1	0.198	-163.2
2.9	0.656	-150.5	1.564	38.6	0.212	60.2	0.206	-164.9
3.0	0.657	-148.8	1.507	36.9	0.220	59.5	0.212	-166.6
4.0	0.700	-134.7	1.150	19.2	0.299	51.3	0.303	-175.3
5.0	0.754	-125.6	0.900	5.7	0.363	35.7	0.368	-147.2

$V_{CE} = 2\text{ V}$, $I_C = 1\text{ mA}$, $Z_o = 50\ \Omega$

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.963	-22.6	3.694	164.6	0.032	77.4	0.986	-6.3
0.2	0.934	-45.4	3.525	150.4	0.062	64.8	0.951	-12.5
0.3	0.911	-64.6	3.208	138.6	0.085	53.5	0.909	-17.7
0.4	0.878	-82.4	2.915	126.7	0.101	44.5	0.861	-22.0
0.5	0.847	-97.3	2.615	117.2	0.111	36.9	0.818	-25.4
0.6	0.826	-110.3	2.350	108.9	0.117	30.6	0.782	-28.6
0.7	0.812	-121.0	2.120	101.6	0.119	25.2	0.754	-31.5
0.8	0.802	-130.4	1.931	94.8	0.120	21.0	0.730	-34.4
0.9	0.795	-138.3	1.757	88.9	0.117	17.2	0.711	-37.3
1.0	0.789	-145.4	1.613	83.5	0.114	14.5	0.694	-40.4
1.1	0.784	-151.4	1.483	78.7	0.109	12.3	0.684	-43.6
1.2	0.779	-156.8	1.370	74.0	0.104	10.8	0.676	-46.8
1.3	0.783	-161.5	1.269	70.1	0.098	10.0	0.670	-50.1
1.4	0.783	-165.9	1.185	66.0	0.091	9.9	0.665	-53.5
1.5	0.788	-169.6	1.112	62.6	0.085	11.0	0.663	-56.9
1.6	0.791	-172.7	1.042	59.2	0.078	13.0	0.659	-60.5
1.7	0.793	-175.9	0.983	56.1	0.072	16.4	0.660	-63.8
1.8	0.795	-179.0	0.928	53.0	0.067	21.7	0.658	-67.3
1.9	0.796	-178.5	0.878	50.6	0.063	28.7	0.658	-70.7
2.0	0.798	-175.9	0.833	47.8	0.061	37.0	0.656	-74.3
2.1	0.802	-173.9	0.798	45.5	0.060	46.4	0.656	-77.8
2.2	0.806	-171.6	0.761	43.0	0.063	55.4	0.657	-81.3
2.3	0.805	-169.4	0.735	41.3	0.068	63.5	0.657	-84.9
2.4	0.805	-167.3	0.703	40.1	0.076	69.9	0.655	-88.8
2.5	0.805	-165.2	0.673	38.2	0.085	74.8	0.657	-92.6
2.6	0.810	-163.1	0.651	37.2	0.096	78.6	0.657	-96.5
2.7	0.811	-161.1	0.629	35.9	0.108	80.5	0.658	-100.4
2.8	0.813	-159.2	0.604	34.7	0.120	81.7	0.662	-104.1
2.9	0.809	-157.4	0.581	34.1	0.133	81.8	0.662	-107.8
3.0	0.807	-155.0	0.556	32.9	0.148	81.8	0.656	-111.7
4.0	0.813	-134.2	0.451	26.7	0.293	69.6	0.671	-149.1
5.0	0.806	-121.8	0.441	22.5	0.397	44.1	0.623	-170.1

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.888	-33.6	9.650	158.8	0.030	72.3	0.954	-12.4
0.2	0.850	-62.4	8.552	141.1	0.055	58.2	0.857	-22.7
0.3	0.794	-85.2	7.287	127.9	0.070	47.1	0.759	-29.5
0.4	0.754	-104.1	6.206	116.5	0.078	39.9	0.674	-33.8
0.5	0.723	-118.6	5.302	108.0	0.083	35.0	0.609	-36.8
0.6	0.705	-130.2	4.613	101.0	0.086	31.5	0.560	-39.1
0.7	0.695	-139.7	4.061	95.2	0.086	29.4	0.525	-41.0
0.8	0.688	-147.6	3.619	89.9	0.086	28.5	0.496	-43.1
0.9	0.688	-153.9	3.244	85.5	0.086	27.8	0.475	-45.2
1.0	0.686	-159.6	2.948	81.1	0.085	28.3	0.458	-47.7
1.1	0.682	-164.3	2.689	77.3	0.083	29.3	0.447	-50.4
1.2	0.682	-168.7	2.470	73.6	0.082	30.6	0.437	-53.0
1.3	0.687	-172.0	2.282	70.5	0.082	32.7	0.431	-55.8
1.4	0.690	-175.5	2.127	67.2	0.081	35.2	0.427	-58.9
1.5	0.696	-178.3	1.991	64.2	0.081	38.2	0.425	-61.9
1.6	0.699	179.2	1.865	61.4	0.081	41.4	0.423	-65.1
1.7	0.701	177.0	1.760	58.7	0.083	45.0	0.424	-68.0
1.8	0.705	174.8	1.661	55.9	0.084	48.7	0.423	-71.1
1.9	0.707	172.7	1.576	53.8	0.087	52.2	0.424	-74.1
2.0	0.709	170.6	1.498	51.1	0.091	55.7	0.423	-77.4
2.1	0.715	169.1	1.429	49.0	0.095	59.0	0.424	-80.7
2.2	0.720	167.6	1.370	46.5	0.100	61.8	0.426	-84.0
2.3	0.721	165.7	1.327	44.7	0.106	64.4	0.427	-87.3
2.4	0.722	164.1	1.268	42.8	0.113	66.3	0.427	-90.9
2.5	0.725	162.3	1.221	40.8	0.121	68.1	0.430	-94.5
2.6	0.727	160.9	1.181	39.3	0.129	69.6	0.434	-98.0
2.7	0.730	159.0	1.141	37.5	0.138	70.3	0.437	-101.8
2.8	0.734	157.5	1.101	35.8	0.147	71.0	0.442	-105.3
2.9	0.730	156.0	1.058	34.3	0.157	70.9	0.445	-108.8
3.0	0.733	154.1	1.011	32.5	0.167	71.1	0.446	-112.6
4.0	0.764	135.9	0.757	16.4	0.283	64.2	0.505	-148.4
5.0	0.791	124.1	0.597	7.6	0.381	43.1	0.516	171.3

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.847	-42.1	14.583	153.9	0.029	71.4	0.918	-17.8
0.2	0.767	-75.3	12.130	134.1	0.050	54.8	0.772	-30.4
0.3	0.712	-99.6	9.834	120.9	0.059	45.2	0.645	-37.6
0.4	0.676	-117.9	8.066	110.2	0.065	39.6	0.550	-41.6
0.5	0.657	-131.3	6.744	102.7	0.069	37.2	0.484	-43.9
0.6	0.644	-141.8	5.777	96.8	0.071	36.3	0.436	-45.7
0.7	0.641	-150.0	5.041	91.7	0.072	36.0	0.402	-47.3
0.8	0.638	-156.6	4.452	87.0	0.074	36.6	0.375	-49.1
0.9	0.636	-162.2	3.979	83.2	0.075	37.7	0.355	-51.1
1.0	0.639	-167.0	3.604	79.4	0.076	39.4	0.339	-53.4
1.1	0.638	-170.9	3.276	76.2	0.078	41.2	0.329	-55.9
1.2	0.639	-174.7	3.006	73.0	0.079	43.1	0.321	-58.6
1.3	0.645	-177.5	2.783	70.2	0.081	45.4	0.315	-61.5
1.4	0.648	179.5	2.588	67.3	0.084	47.6	0.311	-64.3
1.5	0.656	177.2	2.418	64.7	0.087	49.9	0.310	-67.3
1.6	0.659	175.3	2.266	62.1	0.090	52.1	0.308	-70.3
1.7	0.662	173.3	2.139	59.6	0.094	54.3	0.309	-73.2
1.8	0.664	171.3	2.021	57.2	0.098	56.7	0.308	-76.2
1.9	0.668	169.6	1.914	55.0	0.102	58.6	0.309	-79.2
2.0	0.670	167.9	1.824	52.7	0.107	60.4	0.310	-82.4
2.1	0.674	166.5	1.737	50.6	0.112	61.9	0.311	-85.5
2.2	0.677	165.1	1.667	48.3	0.118	63.3	0.312	-88.9
2.3	0.680	163.6	1.616	46.4	0.125	64.6	0.314	-92.1
2.4	0.682	162.3	1.547	44.7	0.132	65.4	0.315	-95.6
2.5	0.686	160.8	1.491	42.8	0.139	66.3	0.319	-99.1
2.6	0.687	159.4	1.443	41.2	0.146	67.0	0.323	-102.7
2.7	0.692	157.9	1.393	39.5	0.154	67.1	0.326	-106.4
2.8	0.696	156.2	1.345	37.5	0.162	67.2	0.332	-109.8
2.9	0.691	155.2	1.296	36.1	0.171	67.0	0.336	-113.3
3.0	0.693	153.3	1.246	34.3	0.181	66.8	0.340	-117.0
4.0	0.734	136.4	0.933	16.6	0.281	60.7	0.413	-151.4
5.0	0.777	125.2	0.721	4.9	0.371	42.0	0.450	169.7

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.777	-49.4	18.629	149.9	0.028	69.2	0.882	-22.1
0.2	0.703	-85.8	14.683	129.2	0.045	51.8	0.701	-36.3
0.3	0.660	-109.4	11.476	116.2	0.052	44.3	0.563	-43.4
0.4	0.630	-127.4	9.203	106.4	0.057	41.4	0.469	-47.1
0.5	0.617	-139.8	7.609	99.5	0.060	40.4	0.405	-49.2
0.6	0.612	-148.8	6.468	94.1	0.063	40.8	0.359	-50.7
0.7	0.608	-156.4	5.599	89.7	0.066	41.7	0.327	-52.2
0.8	0.610	-162.3	4.946	85.3	0.068	43.2	0.302	-54.0
0.9	0.612	-167.2	4.401	81.9	0.071	44.7	0.284	-56.1
1.0	0.614	-171.4	3.977	78.5	0.074	46.6	0.270	-58.5
1.1	0.614	-174.9	3.619	75.5	0.077	48.5	0.260	-61.1
1.2	0.616	-178.4	3.321	72.5	0.080	50.4	0.253	-64.0
1.3	0.624	-179.1	3.069	70.0	0.084	52.2	0.248	-67.0
1.4	0.627	-176.4	2.855	67.3	0.088	54.1	0.244	-69.9
1.5	0.636	-174.5	2.668	64.9	0.092	55.7	0.244	-73.0
1.6	0.636	-172.9	2.500	62.4	0.096	57.2	0.242	-76.1
1.7	0.639	-170.9	2.358	60.1	0.101	58.7	0.243	-79.1
1.8	0.644	-169.4	2.229	57.8	0.106	60.4	0.243	-82.0
1.9	0.647	-167.6	2.113	55.8	0.111	61.3	0.244	-85.0
2.0	0.650	-166.0	2.014	53.6	0.117	62.3	0.245	-88.2
2.1	0.655	-164.8	1.922	51.6	0.123	63.3	0.246	-91.5
2.2	0.658	-163.5	1.843	49.3	0.129	64.2	0.248	-94.7
2.3	0.658	-162.2	1.782	47.6	0.136	64.8	0.250	-97.9
2.4	0.660	-161.0	1.710	46.0	0.143	65.0	0.252	-101.5
2.5	0.663	-159.6	1.643	44.0	0.150	65.4	0.256	-105.1
2.6	0.665	-158.4	1.591	42.4	0.157	65.8	0.260	-108.6
2.7	0.668	-156.9	1.540	40.7	0.165	65.6	0.265	-112.3
2.8	0.674	-155.5	1.486	38.8	0.172	65.5	0.270	-115.5
2.9	0.669	-154.4	1.436	37.5	0.181	65.0	0.276	-119.1
3.0	0.673	-152.6	1.380	35.6	0.190	64.7	0.281	-122.6
4.0	0.716	-136.7	1.040	17.5	0.282	58.5	0.361	-155.4
5.0	0.768	-126.0	0.803	4.7	0.366	41.0	0.409	-167.0

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.717	-59.4	23.348	145.1	0.025	63.5	0.833	-27.6
0.2	0.644	-97.6	17.228	123.6	0.039	51.0	0.619	-42.9
0.3	0.611	-120.6	13.025	111.4	0.045	45.3	0.478	-49.8
0.4	0.594	-137.0	10.243	102.6	0.050	44.5	0.388	-53.2
0.5	0.585	-148.1	8.383	96.5	0.054	45.3	0.329	-55.2
0.6	0.583	-156.2	7.082	91.6	0.058	46.7	0.287	-56.9
0.7	0.584	-162.4	6.107	87.6	0.061	48.2	0.259	-58.4
0.8	0.586	-167.8	5.385	83.7	0.065	50.1	0.236	-60.5
0.9	0.590	-171.9	4.775	80.8	0.069	51.8	0.220	-63.0
1.0	0.593	-175.8	4.316	77.6	0.074	53.5	0.207	-65.9
1.1	0.595	-178.8	3.919	74.9	0.078	55.3	0.198	-69.0
1.2	0.596	-178.0	3.600	72.2	0.082	56.7	0.192	-72.3
1.3	0.602	-176.1	3.326	69.7	0.087	58.1	0.189	-75.7
1.4	0.608	-173.6	3.093	67.3	0.092	59.2	0.186	-78.9
1.5	0.617	-171.9	2.888	65.0	0.097	60.4	0.186	-82.1
1.6	0.619	-170.4	2.708	62.7	0.103	61.1	0.186	-85.4
1.7	0.622	-168.8	2.554	60.5	0.108	62.0	0.187	-88.5
1.8	0.626	-167.3	2.413	58.3	0.114	63.0	0.187	-91.7
1.9	0.627	-166.0	2.289	56.5	0.120	63.5	0.189	-94.6
2.0	0.634	-164.2	2.180	54.3	0.126	64.0	0.190	-98.0
2.1	0.634	-163.2	2.080	52.4	0.132	64.4	0.192	-101.1
2.2	0.640	-162.2	1.998	50.3	0.139	64.7	0.194	-104.5
2.3	0.640	-160.9	1.931	48.7	0.146	64.9	0.197	-107.7
2.4	0.641	-159.7	1.851	47.0	0.153	64.9	0.199	-111.1
2.5	0.644	-158.5	1.786	45.1	0.160	64.9	0.204	-114.7
2.6	0.647	-157.2	1.728	43.6	0.167	64.9	0.208	-118.0
2.7	0.649	-155.8	1.670	41.9	0.175	64.5	0.213	-121.7
2.8	0.655	-154.5	1.616	40.1	0.182	64.1	0.220	-124.8
2.9	0.651	-153.5	1.561	38.7	0.190	63.5	0.226	-128.3
3.0	0.654	-151.8	1.500	36.9	0.198	63.1	0.231	-131.3
4.0	0.698	-136.6	1.138	18.9	0.284	56.3	0.317	-161.6
5.0	0.756	-126.6	0.880	5.3	0.362	39.9	0.374	-162.9

$V_{CE} = 2\text{ V}$, $I_C = 15\text{ mA}$, $Z_o = 50\ \Omega$

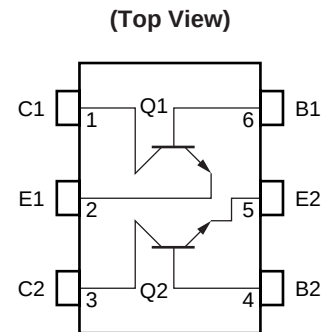
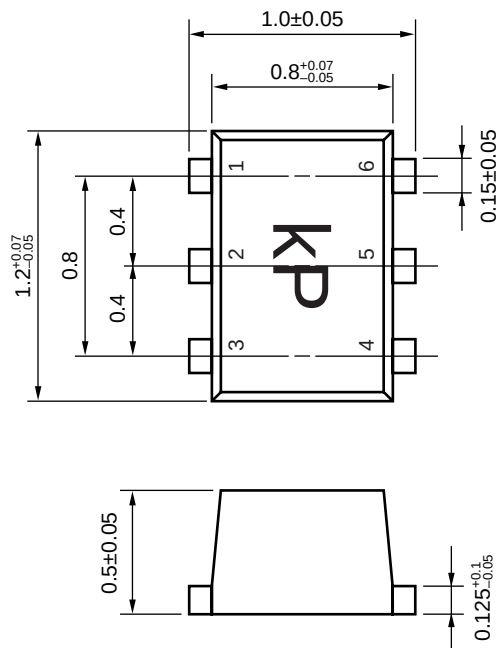
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.636	-72.0	28.720	139.1	0.022	64.4	0.766	-34.4
0.2	0.585	-111.7	19.710	117.8	0.034	51.3	0.527	-50.5
0.3	0.565	-132.7	14.400	106.8	0.039	48.4	0.390	-57.2
0.4	0.562	-147.0	11.140	99.1	0.044	49.5	0.309	-60.7
0.5	0.558	-156.2	9.050	93.8	0.049	51.4	0.257	-63.0
0.6	0.560	-163.4	7.618	89.3	0.054	53.6	0.221	-65.2
0.7	0.563	-168.6	6.558	85.7	0.059	55.4	0.195	-67.4
0.8	0.566	-173.1	5.757	82.3	0.064	57.3	0.176	-70.5
0.9	0.573	-176.8	5.117	79.6	0.069	58.5	0.162	-73.9
1.0	0.576	-179.8	4.608	76.7	0.074	59.9	0.152	-78.0
1.1	0.579	177.5	4.187	74.2	0.080	61.1	0.146	-82.0
1.2	0.582	174.8	3.840	71.8	0.086	62.1	0.142	-86.1
1.3	0.590	173.1	3.545	69.5	0.091	62.6	0.140	-90.3
1.4	0.594	170.8	3.299	67.3	0.097	63.3	0.139	-94.1
1.5	0.601	169.4	3.083	65.1	0.103	63.9	0.140	-97.6
1.6	0.604	168.0	2.889	62.9	0.109	64.3	0.141	-101.2
1.7	0.606	166.6	2.725	60.8	0.116	64.6	0.143	-104.2
1.8	0.610	165.2	2.575	58.7	0.122	65.1	0.144	-107.6
1.9	0.615	164.1	2.441	57.0	0.128	65.2	0.146	-110.4
2.0	0.617	162.6	2.326	54.9	0.135	65.2	0.149	-113.8
2.1	0.621	161.7	2.221	53.2	0.141	65.3	0.151	-117.0
2.2	0.624	160.6	2.132	51.1	0.148	65.2	0.154	-120.2
2.3	0.625	159.4	2.062	49.5	0.155	65.0	0.158	-123.3
2.4	0.626	158.2	1.976	48.0	0.162	64.7	0.161	-126.6
2.5	0.631	157.1	1.902	46.1	0.170	64.4	0.166	-129.9
2.6	0.630	156.2	1.840	44.7	0.176	64.2	0.171	-132.8
2.7	0.634	154.8	1.788	43.1	0.184	63.6	0.177	-136.2
2.8	0.639	153.6	1.723	41.3	0.191	63.1	0.184	-138.9
2.9	0.635	152.7	1.668	40.0	0.199	62.3	0.191	-141.8
3.0	0.637	151.0	1.602	38.1	0.207	61.7	0.197	-144.5
4.0	0.681	136.5	1.222	20.3	0.288	54.4	0.286	-170.1
5.0	0.745	126.9	0.949	6.2	0.359	38.5	0.348	157.2

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
0.1	0.585	-81.0	32.144	134.9	0.021	62.1	0.711	-39.3
0.2	0.555	-121.9	21.060	114.2	0.030	52.7	0.465	-55.9
0.3	0.546	-140.8	15.111	104.0	0.036	51.9	0.336	-62.6
0.4	0.546	-153.5	11.601	96.9	0.041	53.5	0.262	-66.4
0.5	0.544	-161.5	9.389	92.0	0.046	56.0	0.216	-69.1
0.6	0.552	-167.6	7.891	88.1	0.052	58.0	0.183	-72.2
0.7	0.553	-172.1	6.777	84.7	0.058	59.7	0.161	-75.4
0.8	0.559	-176.3	5.942	81.4	0.063	61.3	0.144	-79.7
0.9	0.564	-179.4	5.269	78.9	0.070	62.1	0.133	-84.3
1.0	0.571	177.7	4.754	76.0	0.076	63.1	0.125	-89.5
1.1	0.571	175.3	4.322	73.8	0.082	64.2	0.121	-94.4
1.2	0.576	172.9	3.953	71.4	0.088	64.6	0.119	-99.4
1.3	0.584	171.2	3.650	69.3	0.094	65.0	0.119	-103.9
1.4	0.586	169.1	3.392	67.1	0.100	65.5	0.119	-108.1
1.5	0.596	167.8	3.172	65.0	0.107	65.7	0.122	-111.6
1.6	0.599	166.6	2.975	62.9	0.113	65.9	0.123	-115.2
1.7	0.603	165.1	2.808	60.9	0.120	65.9	0.126	-118.2
1.8	0.604	164.0	2.648	58.9	0.126	66.1	0.128	-121.5
1.9	0.608	162.8	2.514	57.2	0.133	66.1	0.131	-124.2
2.0	0.614	161.6	2.397	55.2	0.140	65.9	0.133	-127.4
2.1	0.616	160.7	2.287	53.6	0.146	65.7	0.137	-130.2
2.2	0.618	159.8	2.193	51.4	0.153	65.4	0.140	-133.3
2.3	0.621	158.5	2.120	49.9	0.161	65.1	0.144	-136.0
2.4	0.620	157.3	2.035	48.3	0.168	64.6	0.148	-139.1
2.5	0.623	156.4	1.960	46.5	0.175	64.2	0.153	-142.0
2.6	0.625	155.3	1.902	45.0	0.182	63.9	0.159	-144.5
2.7	0.628	154.0	1.840	43.6	0.190	63.1	0.165	-147.4
2.8	0.632	152.8	1.775	41.9	0.197	62.5	0.172	-149.7
2.9	0.628	152.0	1.720	40.5	0.205	61.7	0.180	-152.2
3.0	0.631	150.4	1.655	38.8	0.212	61.0	0.186	-154.4
4.0	0.675	136.1	1.262	21.0	0.290	53.3	0.274	-176.3
5.0	0.738	127.1	0.985	7.0	0.358	37.7	0.338	152.9

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

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

- **The information in this document is current as of April, 2002. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
- No part of this document may be copied or reproduced in any form or by any means without prior written consent of NEC. NEC assumes no responsibility for any errors that may appear in this document.
- NEC does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC semiconductor products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of customer's equipment shall be done under the full responsibility of customer. NEC assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC endeavours to enhance the quality, reliability and safety of NEC semiconductor products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC semiconductor products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment, and anti-failure features.
- NEC semiconductor products are classified into the following three quality grades:
 "Standard", "Special" and "Specific". The "Specific" quality grade applies only to semiconductor products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of a semiconductor product depend on its quality grade, as indicated below. Customers must check the quality grade of each semiconductor product before using it in a particular application.
 "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
 "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
 "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
 The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
 (Note)
 (1) "NEC" as used in this statement means NEC Corporation, NEC Compound Semiconductor Devices, Ltd. and also includes its majority-owned subsidiaries.
 (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

M8E 00.4-0110

► **Business issue**

NEC Compound Semiconductor Devices, Ltd.

5th Sales Group, Sales Division TEL: +81-3-3798-6372 FAX: +81-3-3798-6783 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited

Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309

Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859

Korea Branch Office TEL: +82-2-528-0301 FAX: +82-2-528-0302

NEC Electron Devices European Operations <http://www.nec.de/>

TEL: +49-211-6503-101 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. <http://www.cel.com/>

TEL: +1-408-988-3500 FAX: +1-408-988-0279

► **Technical issue**

NEC Compound Semiconductor Devices, Ltd. <http://www.csd-nec.com/>

Sales Engineering Group, Sales Division

E-mail: techinfo@csd-nec.com FAX: +81-44-435-1918