

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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NPN SILICON RF TWIN TRANSISTOR

Phase-out/Discontinued

μPA891TD

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

FEATURES

- Built-in low phase distortion transistor suited for OSC operation
 $f_T = 5.0 \text{ GHz TYP.}$, $|S_{21e}|^2 = 4.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_c = 5 \text{ mA, } f = 2 \text{ GHz}$
- Built-in 2 transistors ($2 \times 2\text{SC}5600$)
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

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

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA891TD	50 pcs (Non reel)	• 8 mm wide embossed taping
μPA891TD-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°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	°C
Storage Temperature	T _{stg}	-65 to +150	°C

Note Mounted on 1.08 cm² × 1.0 mm (t) glass epoxy substrate

Because this product uses high-frequency technology, avoid excessive static electricity, etc.

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 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	–	–	600	nA
Emitter Cut-off Current	I _{EBO}	V _{BE} = 1 V, I _C = 0 mA	–	–	600	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 5 mA	100	–	160	–
Gain Bandwidth Product (1)	f _T	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	3.5	5.0	–	GHz
Gain Bandwidth Product (2)	f _T	V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz	5.5	6.5	–	GHz
Insertion Power Gain (1)	S _{21e} ²	V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz	3.5	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 = 5 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.5	2.5	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz	–	0.8	1.0	pF

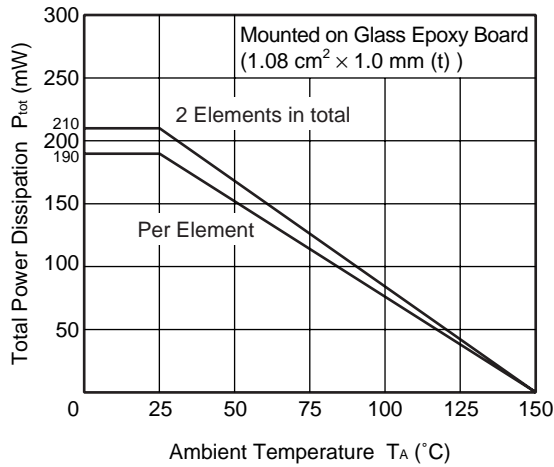
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
 2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

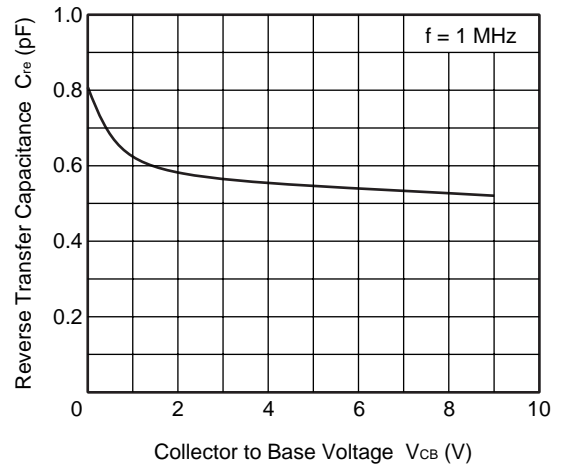
Rank	FB
Marking	kH
h _{FE} Value	100 to 160

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

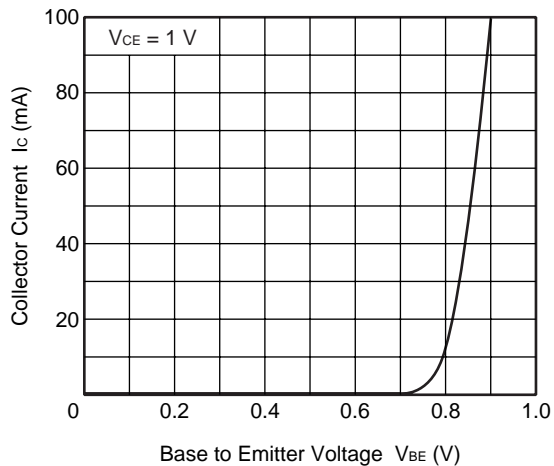
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



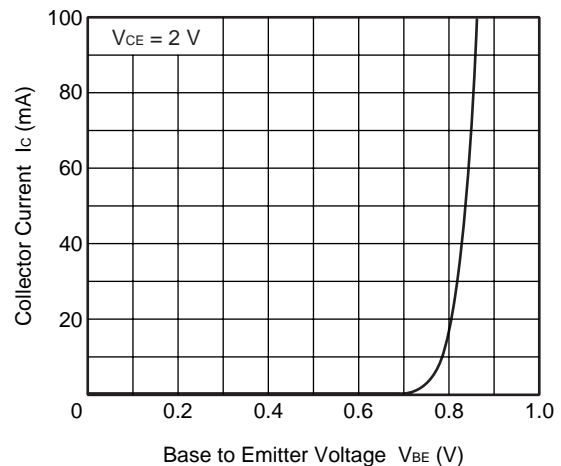
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



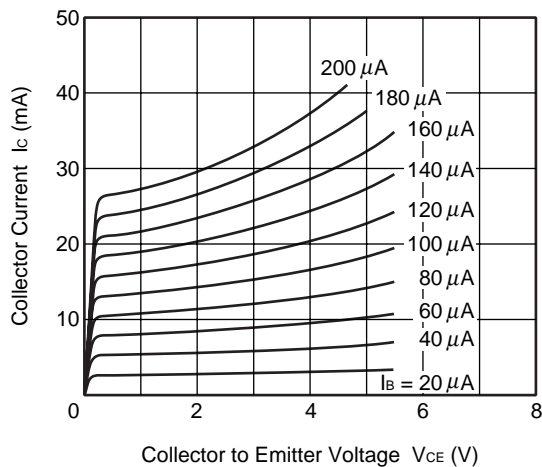
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



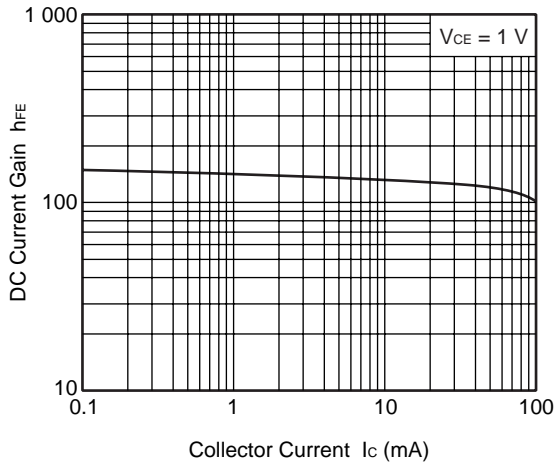
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



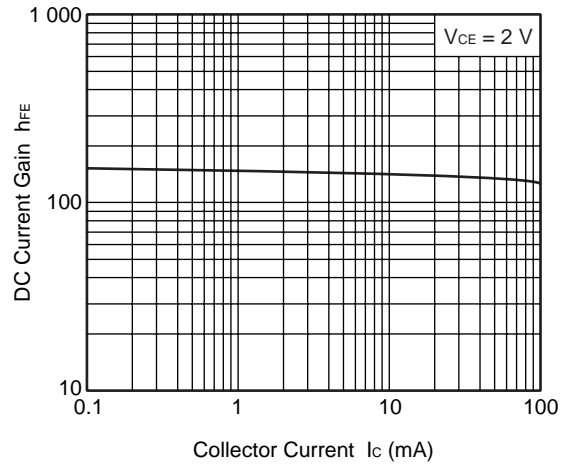
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



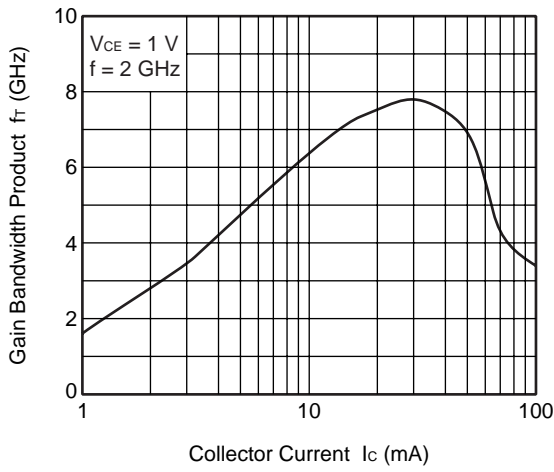
DC CURRENT GAIN vs.
COLLECTOR CURRENT



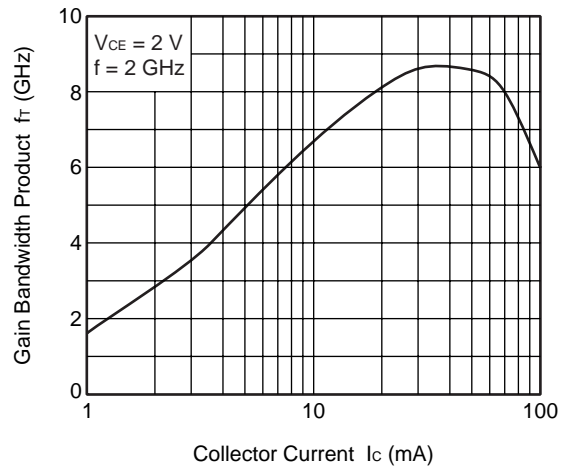
DC CURRENT GAIN vs.
COLLECTOR CURRENT



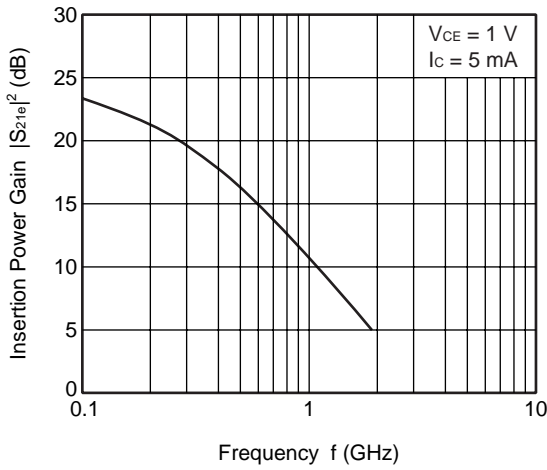
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



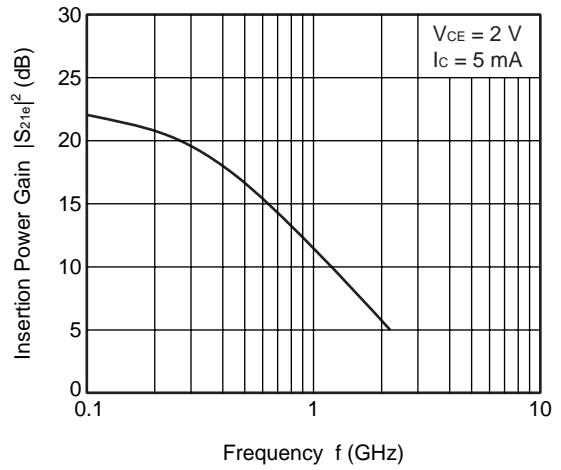
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



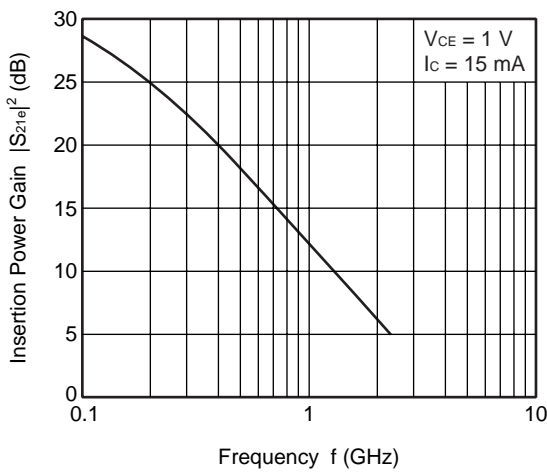
INSERTION POWER GAIN vs. FREQUENCY



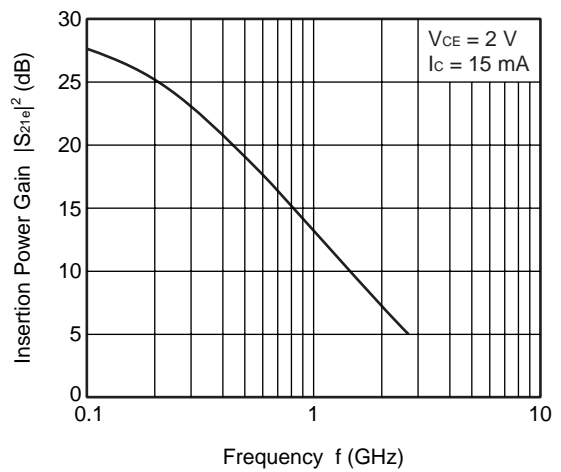
INSERTION POWER GAIN vs. FREQUENCY



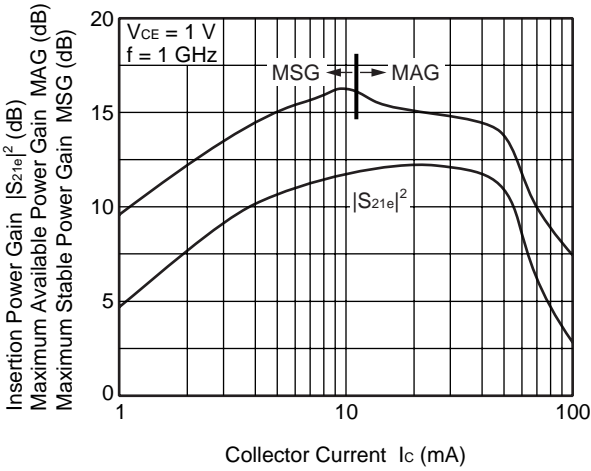
INSERTION POWER GAIN vs. FREQUENCY



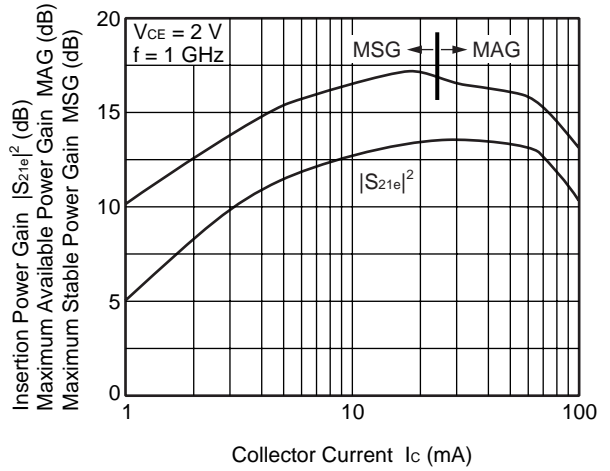
INSERTION POWER GAIN vs. FREQUENCY



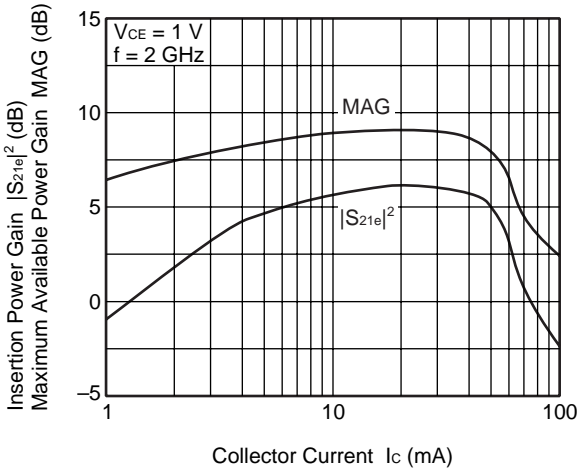
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



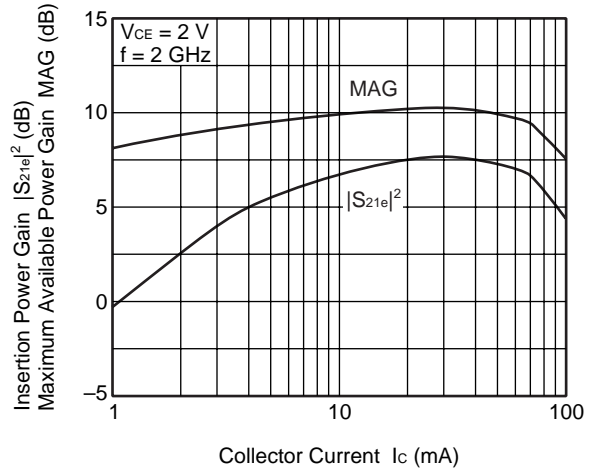
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



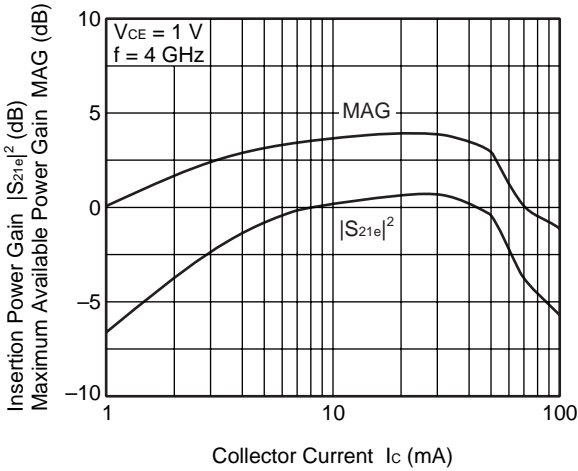
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



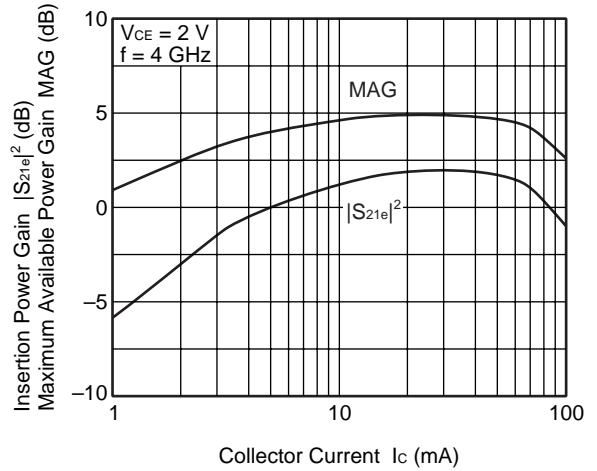
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



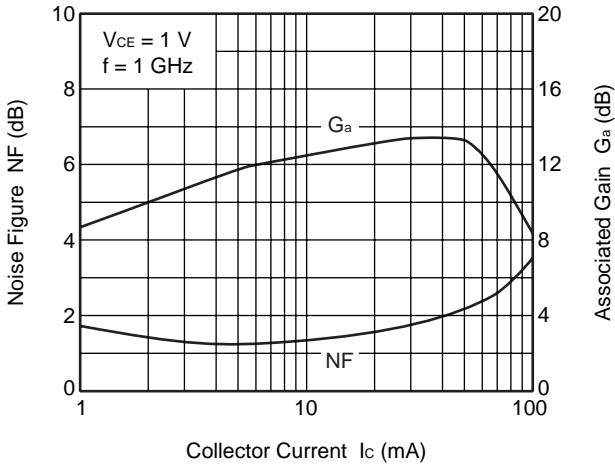
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



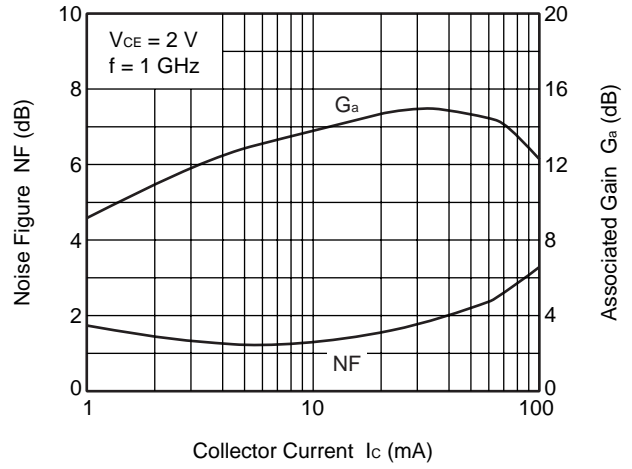
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



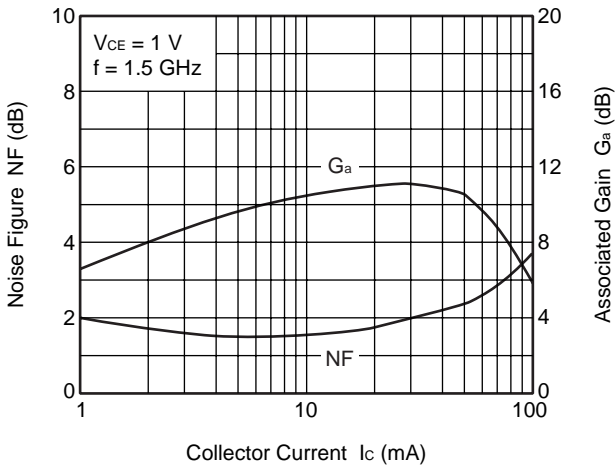
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



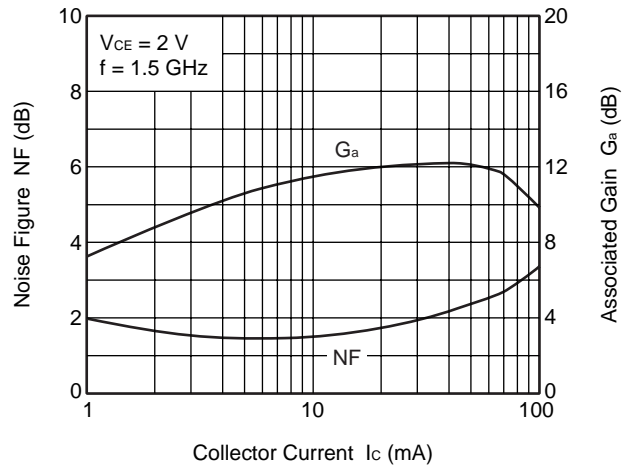
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



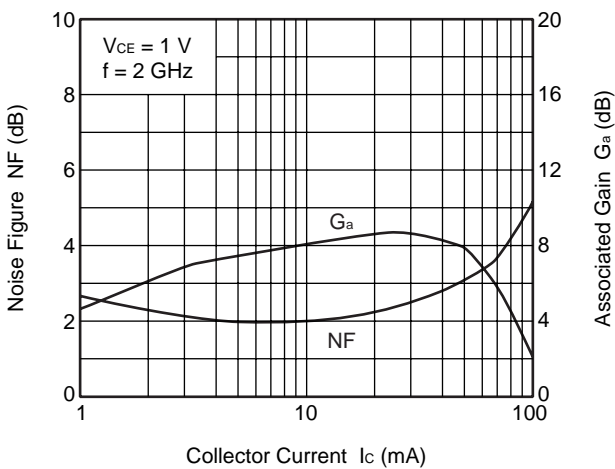
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



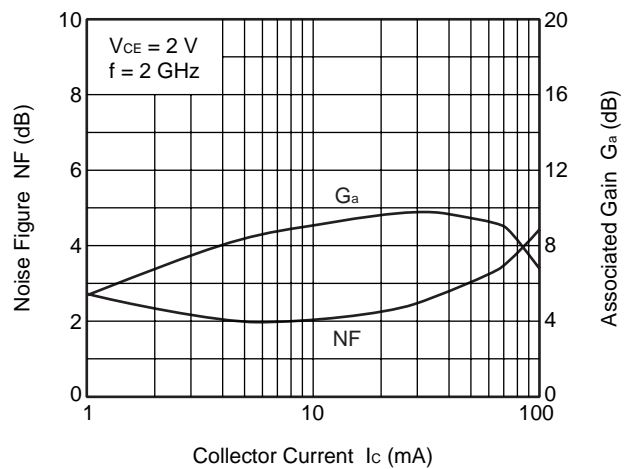
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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

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

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	0.969	-20.0	3.596	166.2	0.045	76.0	0.989	-7.4	0.092	19.04	
0.2	0.946	-39.8	3.407	153.4	0.086	67.1	0.949	-14.7	0.087	15.99	
0.3	0.906	-58.9	3.167	140.9	0.119	56.7	0.898	-21.1	0.128	14.25	
0.4	0.868	-75.3	2.906	129.3	0.145	47.6	0.839	-26.5	0.186	13.01	
0.5	0.843	-90.0	2.676	119.9	0.164	39.8	0.783	-30.9	0.226	12.13	
0.6	0.806	-103.7	2.427	110.7	0.176	33.1	0.728	-34.8	0.282	11.39	
0.7	0.778	-115.5	2.212	103.1	0.184	27.3	0.686	-37.9	0.333	10.79	
0.8	0.760	-125.9	2.016	96.3	0.188	22.4	0.647	-41.0	0.382	10.31	
0.9	0.749	-135.1	1.840	89.9	0.190	18.1	0.618	-43.9	0.428	9.87	
1.0	0.741	-143.3	1.700	84.0	0.189	14.6	0.593	-46.6	0.477	9.55	
1.1	0.732	-150.5	1.571	78.9	0.187	11.4	0.576	-49.4	0.530	9.25	
1.2	0.731	-157.1	1.451	74.0	0.183	8.8	0.560	-52.0	0.580	8.99	
1.3	0.734	-162.8	1.356	69.6	0.179	6.5	0.551	-54.8	0.621	8.80	
1.4	0.734	-167.8	1.266	65.4	0.174	4.5	0.543	-57.5	0.680	8.62	
1.5	0.736	-172.3	1.190	61.5	0.168	3.1	0.540	-60.2	0.729	8.50	
1.6	0.739	-176.3	1.121	57.7	0.163	1.9	0.535	-62.8	0.791	8.38	
1.7	0.743	-179.9	1.054	54.5	0.156	1.1	0.537	-65.4	0.844	8.29	
1.8	0.744	-176.4	1.000	51.2	0.150	0.9	0.534	-68.0	0.920	8.25	
1.9	0.745	-172.8	0.947	48.2	0.143	0.9	0.537	-70.5	0.997	8.21	
2.0	0.749	-170.0	0.903	45.1	0.137	1.8	0.535	-72.9	1.076	6.52	
2.1	0.751	-167.1	0.871	43.0	0.130	2.9	0.539	-75.5	1.134	6.03	
2.2	0.752	-164.4	0.831	40.5	0.125	4.4	0.538	-78.0	1.240	5.29	
2.3	0.756	-161.4	0.799	38.4	0.119	6.6	0.543	-80.5	1.302	4.97	
2.4	0.761	-158.7	0.769	36.1	0.115	8.9	0.539	-83.0	1.386	4.56	
2.5	0.762	-156.0	0.738	34.0	0.111	12.2	0.542	-85.9	1.474	4.15	
2.6	0.766	-153.3	0.711	32.4	0.107	15.8	0.543	-88.8	1.555	3.83	
2.7	0.764	-150.5	0.686	30.4	0.106	20.0	0.545	-91.7	1.636	3.45	
2.8	0.768	-147.9	0.658	29.1	0.106	24.2	0.545	-94.4	1.691	3.09	
2.9	0.755	-144.8	0.625	27.0	0.109	28.0	0.542	-97.5	1.861	2.24	
3.0	0.749	-141.3	0.605	24.8	0.113	32.5	0.539	-101.1	1.923	1.75	
4.0	0.781	-123.7	0.468	14.0	0.181	51.3	0.579	-134.6	1.464	0.09	
5.0	0.789	-101.1	0.394	12.0	0.286	40.3	0.626	-164.0	1.283	-1.81	

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	0.913	-33.3	9.705	159.5	0.044	72.6	0.948	-16.0	0.062	23.46
0.2	0.851	-61.4	8.525	141.8	0.075	58.1	0.834	-29.6	0.131	20.56
0.3	0.780	-86.0	7.262	127.5	0.096	47.1	0.717	-39.4	0.205	18.80
0.4	0.732	-105.4	6.153	116.2	0.108	39.5	0.612	-46.6	0.276	17.54
0.5	0.704	-120.5	5.315	107.6	0.116	34.1	0.531	-51.5	0.344	16.61
0.6	0.680	-133.0	4.598	100.4	0.120	30.4	0.464	-55.7	0.417	15.83
0.7	0.667	-143.3	4.040	94.4	0.123	27.6	0.416	-58.8	0.485	15.17
0.8	0.657	-152.1	3.589	89.4	0.124	25.9	0.377	-62.0	0.557	14.61
0.9	0.655	-159.4	3.209	84.7	0.125	24.5	0.349	-64.8	0.620	14.08
1.0	0.653	-165.8	2.911	80.5	0.125	24.1	0.327	-67.8	0.686	13.66
1.1	0.655	-171.3	2.662	76.7	0.126	23.6	0.312	-70.6	0.743	13.26
1.2	0.658	-176.5	2.436	73.2	0.126	23.6	0.299	-73.4	0.805	12.88
1.3	0.663	179.6	2.259	69.9	0.125	23.8	0.293	-76.2	0.855	12.57
1.4	0.665	175.8	2.101	66.8	0.126	24.4	0.287	-78.8	0.913	12.24
1.5	0.667	172.4	1.964	63.7	0.125	25.2	0.286	-81.2	0.967	11.95
1.6	0.673	169.6	1.845	61.0	0.126	25.9	0.282	-83.7	1.010	11.04
1.7	0.677	166.6	1.731	58.4	0.126	27.0	0.285	-85.8	1.056	9.92
1.8	0.678	164.0	1.637	55.7	0.127	28.4	0.283	-88.0	1.112	9.07
1.9	0.680	161.6	1.555	53.3	0.128	29.5	0.287	-89.9	1.147	8.51
2.0	0.681	159.4	1.481	50.7	0.130	31.2	0.286	-91.9	1.193	7.93
2.1	0.684	157.0	1.425	48.7	0.131	32.6	0.290	-94.0	1.209	7.60
2.2	0.685	155.0	1.361	46.6	0.134	33.8	0.289	-96.1	1.244	7.11
2.3	0.691	152.5	1.310	44.8	0.136	35.3	0.293	-98.1	1.243	6.85
2.4	0.692	150.5	1.263	42.7	0.140	36.4	0.291	-100.3	1.265	6.47
2.5	0.696	148.2	1.216	40.7	0.144	37.8	0.294	-102.8	1.264	6.19
2.6	0.698	146.0	1.172	38.8	0.147	38.9	0.296	-105.2	1.284	5.83
2.7	0.698	143.8	1.131	36.9	0.151	39.8	0.298	-108.0	1.299	5.47
2.8	0.698	141.6	1.088	35.2	0.156	40.5	0.300	-110.5	1.314	5.09
2.9	0.688	138.9	1.039	32.9	0.163	40.5	0.302	-113.6	1.361	4.47
3.0	0.685	135.9	1.004	30.6	0.169	41.2	0.303	-116.9	1.373	4.08
4.0	0.726	121.3	0.781	15.4	0.222	44.3	0.375	-147.7	1.243	2.50
5.0	0.753	101.1	0.605	4.5	0.295	34.3	0.461	-171.6	1.156	0.72

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	0.843	-43.2	14.558	153.7	0.041	66.1	0.905	-23.2	0.130	25.50
0.2	0.769	-77.8	11.865	133.5	0.066	53.2	0.736	-40.7	0.185	22.54
0.3	0.702	-104.2	9.473	119.4	0.080	43.8	0.590	-52.0	0.283	20.72
0.4	0.664	-122.6	7.711	109.1	0.088	38.1	0.481	-60.0	0.380	19.44
0.5	0.651	-136.6	6.482	101.4	0.093	34.9	0.403	-65.5	0.458	18.45
0.6	0.633	-147.8	5.516	95.3	0.096	33.3	0.344	-70.5	0.552	17.59
0.7	0.628	-156.5	4.788	90.2	0.099	32.4	0.302	-74.5	0.629	16.85
0.8	0.627	-164.0	4.217	86.0	0.101	32.5	0.270	-78.9	0.704	16.20
0.9	0.627	-170.1	3.760	82.0	0.104	32.6	0.248	-82.9	0.771	15.59
1.0	0.629	-175.3	3.396	78.5	0.106	33.3	0.231	-87.1	0.834	15.06
1.1	0.631	179.8	3.092	75.3	0.108	33.7	0.221	-90.8	0.891	14.56
1.2	0.637	175.6	2.827	72.2	0.111	34.5	0.213	-94.5	0.939	14.06
1.3	0.641	172.2	2.615	69.3	0.113	35.5	0.210	-97.7	0.981	13.63
1.4	0.647	168.9	2.430	66.6	0.117	36.4	0.207	-100.9	1.015	12.45
1.5	0.649	166.3	2.268	64.0	0.119	37.4	0.207	-103.3	1.055	11.36
1.6	0.653	163.6	2.133	61.4	0.122	38.1	0.206	-106.1	1.081	10.67
1.7	0.659	161.3	2.002	59.1	0.126	39.0	0.209	-107.7	1.103	10.07
1.8	0.660	159.0	1.892	56.8	0.129	40.2	0.208	-110.0	1.138	9.41
1.9	0.663	156.7	1.796	54.6	0.133	40.9	0.211	-111.4	1.149	8.96
2.0	0.665	154.7	1.712	52.1	0.137	41.8	0.210	-113.3	1.169	8.48
2.1	0.668	152.7	1.643	50.3	0.141	42.6	0.214	-114.9	1.173	8.14
2.2	0.667	151.0	1.575	48.5	0.146	43.1	0.213	-116.9	1.192	7.68
2.3	0.671	148.8	1.512	46.7	0.151	43.7	0.217	-118.4	1.189	7.38
2.4	0.673	146.8	1.458	44.6	0.156	44.0	0.216	-120.5	1.193	7.06
2.5	0.675	145.0	1.405	42.8	0.161	44.4	0.220	-122.6	1.192	6.75
2.6	0.676	142.9	1.356	41.2	0.166	44.7	0.220	-124.9	1.203	6.40
2.7	0.678	140.9	1.306	39.2	0.172	44.8	0.224	-127.5	1.207	6.07
2.8	0.678	138.6	1.261	37.6	0.177	44.6	0.226	-130.0	1.214	5.73
2.9	0.667	136.4	1.204	35.2	0.185	43.8	0.231	-132.9	1.251	5.12
3.0	0.663	133.4	1.165	33.1	0.192	43.7	0.234	-135.8	1.267	4.72
4.0	0.706	119.9	0.909	17.7	0.241	42.5	0.318	-161.9	1.188	3.14
5.0	0.737	100.6	0.705	5.2	0.303	31.8	0.406	179.3	1.135	0.43

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	0.794	-52.8	18.401	149.1	0.038	64.6	0.862	-29.1	0.121	26.86
0.2	0.722	-90.1	14.049	127.9	0.059	50.3	0.658	-49.1	0.230	23.75
0.3	0.655	-116.7	10.776	114.2	0.069	42.2	0.507	-61.3	0.358	21.92
0.4	0.631	-134.0	8.572	104.8	0.075	38.9	0.403	-70.1	0.465	20.55
0.5	0.622	-146.4	7.099	97.8	0.080	37.5	0.332	-76.5	0.558	19.49
0.6	0.613	-156.3	5.999	92.4	0.084	37.3	0.281	-82.9	0.654	18.56
0.7	0.612	-164.2	5.187	87.9	0.087	37.3	0.246	-88.0	0.733	17.75
0.8	0.613	-170.6	4.552	84.1	0.091	38.2	0.221	-94.0	0.804	17.00
0.9	0.617	-176.0	4.042	80.5	0.095	38.9	0.204	-99.0	0.863	16.30
1.0	0.620	179.4	3.649	77.4	0.098	40.0	0.193	-104.5	0.918	15.70
1.1	0.623	175.0	3.320	74.4	0.102	40.8	0.187	-108.9	0.964	15.12
1.2	0.628	171.0	3.034	71.5	0.106	41.6	0.183	-113.2	1.004	14.17
1.3	0.636	168.2	2.801	69.0	0.110	42.6	0.183	-116.6	1.030	13.00
1.4	0.638	165.3	2.602	66.5	0.115	43.4	0.183	-119.9	1.060	12.06
1.5	0.643	162.8	2.430	64.0	0.119	44.2	0.184	-122.1	1.080	11.38
1.6	0.648	160.5	2.287	61.6	0.124	44.8	0.185	-124.9	1.093	10.81
1.7	0.652	158.2	2.142	59.4	0.128	45.4	0.188	-126.2	1.111	10.21
1.8	0.652	156.2	2.028	57.2	0.133	46.2	0.188	-128.5	1.133	9.63
1.9	0.655	154.1	1.922	55.2	0.138	46.5	0.192	-129.5	1.141	9.16
2.0	0.656	152.2	1.834	52.8	0.143	47.0	0.190	-131.3	1.155	8.70
2.1	0.658	150.5	1.762	51.2	0.148	47.3	0.194	-132.5	1.155	8.37
2.2	0.659	148.6	1.688	49.4	0.154	47.3	0.193	-134.5	1.162	7.97
2.3	0.663	146.5	1.618	47.7	0.160	47.4	0.196	-135.8	1.158	7.65
2.4	0.664	144.9	1.562	45.6	0.166	47.4	0.196	-137.8	1.161	7.32
2.5	0.667	142.9	1.505	43.8	0.172	47.5	0.199	-139.4	1.155	7.04
2.6	0.668	141.0	1.451	42.2	0.177	47.3	0.201	-141.6	1.161	6.69
2.7	0.669	139.1	1.400	40.4	0.183	47.0	0.204	-144.0	1.167	6.36
2.8	0.669	137.1	1.350	38.9	0.189	46.4	0.207	-146.2	1.176	6.00
2.9	0.658	134.9	1.290	36.6	0.197	45.3	0.214	-148.7	1.205	5.42
3.0	0.652	132.0	1.248	34.4	0.204	45.0	0.217	-151.1	1.223	5.01
4.0	0.698	119.0	0.977	19.3	0.252	41.9	0.304	-172.3	1.157	3.49
5.0	0.727	100.4	0.760	6.3	0.309	30.6	0.388	172.3	1.129	1.72

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	0.719	-63.4	22.631	143.4	0.035	62.6	0.806	-36.4	0.167	28.07
0.2	0.660	-103.7	16.109	121.7	0.051	48.3	0.574	-58.7	0.306	24.97
0.3	0.621	-129.0	11.887	109.3	0.059	43.2	0.427	-71.9	0.446	23.04
0.4	0.606	-144.9	9.279	100.8	0.064	41.5	0.335	-82.0	0.568	21.58
0.5	0.602	-155.7	7.600	94.6	0.070	41.5	0.276	-89.7	0.666	20.37
0.6	0.602	-164.2	6.377	89.9	0.074	42.6	0.236	-98.0	0.758	19.35
0.7	0.602	-170.9	5.497	85.8	0.079	43.4	0.209	-104.6	0.833	18.45
0.8	0.606	-176.6	4.826	82.4	0.083	44.6	0.192	-112.1	0.892	17.63
0.9	0.609	178.8	4.278	79.3	0.089	45.6	0.183	-118.2	0.942	16.83
1.0	0.615	174.6	3.852	76.4	0.094	46.7	0.178	-124.3	0.982	16.14
1.1	0.619	170.8	3.506	73.6	0.099	47.5	0.177	-128.7	1.016	14.74
1.2	0.624	167.4	3.197	71.1	0.104	48.3	0.177	-133.0	1.043	13.59
1.3	0.632	164.8	2.953	68.6	0.109	49.0	0.179	-136.0	1.059	12.83
1.4	0.635	162.0	2.744	66.2	0.115	49.5	0.182	-139.1	1.078	12.07
1.5	0.639	159.7	2.559	63.9	0.120	50.0	0.184	-140.8	1.092	11.42
1.6	0.642	157.6	2.406	61.7	0.126	50.3	0.186	-143.3	1.102	10.86
1.7	0.648	155.7	2.257	59.6	0.132	50.4	0.189	-144.3	1.109	10.34
1.8	0.648	153.8	2.136	57.6	0.137	50.8	0.190	-146.5	1.125	9.77
1.9	0.648	151.8	2.028	55.6	0.143	50.8	0.193	-147.0	1.132	9.31
2.0	0.651	150.0	1.932	53.5	0.149	51.0	0.193	-148.8	1.136	8.88
2.1	0.656	148.3	1.856	51.8	0.155	50.9	0.195	-149.7	1.128	8.60
2.2	0.654	146.7	1.777	50.1	0.161	50.6	0.194	-151.7	1.137	8.17
2.3	0.658	144.9	1.704	48.5	0.168	50.4	0.197	-152.7	1.133	7.85
2.4	0.659	142.9	1.647	46.5	0.174	50.0	0.197	-154.5	1.131	7.55
2.5	0.660	141.2	1.586	44.8	0.181	49.7	0.200	-156.0	1.129	7.24
2.6	0.663	139.4	1.529	43.1	0.187	49.4	0.201	-158.1	1.132	6.92
2.7	0.663	137.7	1.477	41.4	0.193	48.7	0.205	-160.1	1.135	6.60
2.8	0.661	135.5	1.423	39.8	0.199	48.0	0.209	-162.0	1.147	6.21
2.9	0.650	133.4	1.358	37.6	0.207	46.6	0.215	-163.6	1.175	5.63
3.0	0.645	130.5	1.314	35.5	0.215	45.9	0.219	-165.8	1.188	5.24
4.0	0.691	118.2	1.031	20.7	0.261	41.5	0.304	177.8	1.138	3.70
5.0	0.720	99.8	0.808	7.5	0.316	29.5	0.383	165.3	1.118	2.00

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	0.604	-90.6	29.779	132.5	0.030	54.5	0.674	-52.0	0.286	30.02
0.2	0.594	-129.7	18.706	111.9	0.039	47.9	0.431	-78.3	0.472	26.82
0.3	0.587	-149.6	13.156	101.8	0.046	48.2	0.315	-94.2	0.638	24.61
0.4	0.589	-161.3	10.043	95.2	0.052	49.5	0.255	-107.4	0.758	22.88
0.5	0.590	-169.2	8.131	90.0	0.058	51.4	0.220	-118.0	0.850	21.50
0.6	0.592	-175.4	6.789	86.2	0.064	53.4	0.202	-128.3	0.919	20.24
0.7	0.597	-179.5	5.830	82.9	0.071	54.6	0.193	-136.0	0.967	19.17
0.8	0.603	-174.8	5.103	79.9	0.077	55.5	0.191	-143.6	1.004	17.82
0.9	0.610	-171.2	4.515	77.2	0.084	56.3	0.191	-148.8	1.028	16.27
1.0	0.614	-168.1	4.060	74.7	0.091	56.8	0.195	-153.6	1.049	15.13
1.1	0.620	-165.0	3.677	72.2	0.098	57.1	0.200	-156.6	1.065	14.19
1.2	0.627	-162.1	3.365	70.1	0.105	57.3	0.205	-159.4	1.074	13.41
1.3	0.632	-160.0	3.105	67.8	0.112	57.5	0.209	-161.3	1.080	12.72
1.4	0.636	-157.7	2.883	65.7	0.119	57.3	0.214	-163.3	1.088	12.05
1.5	0.642	-155.7	2.690	63.6	0.125	57.3	0.217	-164.4	1.089	11.50
1.6	0.644	-153.7	2.527	61.6	0.132	57.0	0.221	-166.1	1.095	10.94
1.7	0.648	-152.1	2.374	59.7	0.139	56.8	0.223	-166.6	1.097	10.44
1.8	0.650	-150.4	2.246	57.7	0.145	56.6	0.225	-168.4	1.101	9.95
1.9	0.649	-148.6	2.130	55.8	0.152	56.1	0.227	-168.7	1.107	9.47
2.0	0.655	-147.0	2.033	53.9	0.159	55.7	0.227	-170.4	1.102	9.13
2.1	0.654	-145.5	1.950	52.3	0.166	55.2	0.228	-171.2	1.104	8.74
2.2	0.653	-143.7	1.870	50.6	0.173	54.5	0.228	-173.0	1.108	8.35
2.3	0.656	-142.3	1.789	49.1	0.180	53.8	0.230	-173.8	1.104	8.01
2.4	0.659	-140.4	1.730	47.3	0.187	53.1	0.230	-175.5	1.098	7.75
2.5	0.660	-138.8	1.667	45.6	0.195	52.5	0.232	-176.6	1.094	7.45
2.6	0.660	-137.1	1.609	44.1	0.201	51.7	0.234	-178.6	1.100	7.11
2.7	0.660	-135.3	1.551	42.3	0.208	50.8	0.238	-180.0	1.103	6.77
2.8	0.659	-133.5	1.496	41.0	0.214	49.7	0.242	-178.5	1.113	6.40
2.9	0.649	-131.3	1.432	38.8	0.222	48.0	0.248	-177.6	1.133	5.88
3.0	0.644	-128.5	1.383	36.8	0.230	47.1	0.251	-176.0	1.144	5.49
4.0	0.686	-117.0	1.085	22.3	0.275	40.9	0.330	-164.8	1.116	3.88
5.0	0.716	-99.2	0.853	9.3	0.325	28.2	0.397	-155.2	1.106	2.21

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	0.979	-18.5	3.473	167.8	0.037	77.8	0.993	-5.8	0.067	19.77
0.2	0.959	-35.7	3.322	156.0	0.071	69.5	0.962	-12.0	0.080	16.69
0.3	0.914	-53.4	3.132	144.2	0.101	60.1	0.921	-17.2	0.126	14.93
0.4	0.877	-69.0	2.916	133.2	0.125	51.6	0.872	-22.1	0.179	13.70
0.5	0.849	-83.3	2.719	124.1	0.143	44.3	0.828	-26.0	0.214	12.81
0.6	0.813	-96.7	2.499	115.1	0.155	37.8	0.778	-29.3	0.269	12.07
0.7	0.785	-108.6	2.294	107.6	0.164	32.1	0.739	-32.3	0.312	11.47
0.8	0.763	-119.1	2.105	100.7	0.168	27.3	0.701	-35.1	0.364	10.98
0.9	0.747	-128.7	1.933	94.3	0.171	23.2	0.674	-37.7	0.409	10.53
1.0	0.734	-137.3	1.792	88.5	0.171	19.8	0.649	-40.2	0.460	10.20
1.1	0.725	-145.0	1.665	83.2	0.170	16.6	0.630	-42.8	0.507	9.90
1.2	0.724	-152.0	1.540	78.3	0.168	14.1	0.615	-45.1	0.553	9.63
1.3	0.722	-158.2	1.440	74.1	0.165	11.8	0.605	-47.7	0.596	9.41
1.4	0.721	-163.7	1.348	69.7	0.161	10.1	0.595	-50.2	0.650	9.22
1.5	0.722	-168.6	1.268	65.7	0.157	8.9	0.591	-52.5	0.699	9.08
1.6	0.723	-173.0	1.197	61.9	0.152	7.9	0.584	-55.1	0.759	8.96
1.7	0.728	-177.0	1.128	58.8	0.147	7.3	0.584	-57.4	0.802	8.84
1.8	0.728	-179.3	1.068	55.3	0.142	7.2	0.581	-59.8	0.877	8.78
1.9	0.726	-175.6	1.016	52.4	0.137	7.5	0.583	-62.2	0.943	8.71
2.0	0.732	-172.5	0.969	49.2	0.131	8.4	0.579	-64.3	1.007	8.17
2.1	0.734	-169.2	0.936	47.1	0.127	9.8	0.583	-66.6	1.045	7.39
2.2	0.733	-166.5	0.891	44.7	0.122	11.3	0.580	-68.9	1.153	6.26
2.3	0.735	-163.3	0.857	42.6	0.118	13.2	0.582	-71.2	1.206	5.86
2.4	0.739	-160.5	0.827	40.2	0.115	15.6	0.578	-73.5	1.268	5.46
2.5	0.741	-157.6	0.796	38.1	0.113	18.7	0.580	-76.1	1.324	5.08
2.6	0.743	-154.9	0.769	36.4	0.110	21.7	0.580	-78.8	1.392	4.72
2.7	0.742	-152.1	0.740	34.2	0.110	25.4	0.579	-81.4	1.458	4.27
2.8	0.742	-149.3	0.709	32.8	0.111	28.8	0.578	-83.9	1.523	3.80
2.9	0.732	-146.0	0.677	30.5	0.114	31.8	0.572	-86.7	1.644	3.04
3.0	0.725	-142.5	0.653	28.1	0.119	35.6	0.568	-90.2	1.704	2.51
4.0	0.758	-124.4	0.511	16.1	0.184	52.1	0.587	-122.6	1.354	0.89
5.0	0.768	-101.7	0.421	12.0	0.286	41.6	0.624	-153.2	1.226	-1.18

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	0.923	-26.4	8.742	163.2	0.037	76.3	0.968	-11.8	0.054	23.78
0.2	0.881	-50.3	7.981	147.8	0.065	63.7	0.889	-22.5	0.111	20.87
0.3	0.813	-72.5	7.075	134.4	0.087	53.5	0.796	-30.8	0.175	19.09
0.4	0.753	-90.5	6.189	123.0	0.102	45.7	0.704	-37.3	0.252	17.82
0.5	0.719	-106.0	5.482	114.1	0.112	39.6	0.627	-41.9	0.308	16.91
0.6	0.685	-119.4	4.820	106.4	0.118	35.5	0.560	-45.6	0.375	16.12
0.7	0.663	-130.5	4.287	100.1	0.122	32.1	0.508	-48.4	0.437	15.47
0.8	0.648	-140.4	3.833	94.7	0.124	29.9	0.465	-51.0	0.500	14.91
0.9	0.638	-148.6	3.452	89.6	0.126	28.1	0.433	-53.4	0.560	14.38
1.0	0.634	-155.9	3.146	85.1	0.126	27.1	0.406	-55.7	0.618	13.96
1.1	0.631	-162.6	2.886	81.1	0.127	26.3	0.387	-58.0	0.675	13.56
1.2	0.632	-168.3	2.648	77.3	0.127	26.0	0.371	-60.2	0.730	13.18
1.3	0.635	-173.2	2.456	73.9	0.127	25.9	0.361	-62.5	0.778	12.85
1.4	0.638	-177.5	2.290	70.6	0.128	26.0	0.351	-64.7	0.826	12.53
1.5	0.639	-178.6	2.140	67.4	0.128	26.5	0.347	-66.8	0.878	12.24
1.6	0.643	-175.2	2.016	64.5	0.128	27.1	0.340	-68.9	0.918	11.96
1.7	0.647	-171.9	1.893	61.7	0.129	27.9	0.341	-70.9	0.960	11.67
1.8	0.649	-169.2	1.791	59.0	0.129	28.9	0.336	-72.7	1.009	10.85
1.9	0.650	-166.1	1.699	56.5	0.130	29.8	0.338	-74.6	1.049	9.80
2.0	0.655	-163.7	1.619	53.8	0.131	31.2	0.334	-76.3	1.080	9.19
2.1	0.655	-161.0	1.557	51.9	0.133	32.6	0.337	-78.2	1.108	8.69
2.2	0.656	-158.8	1.489	49.7	0.135	33.6	0.334	-80.1	1.143	8.14
2.3	0.658	-156.3	1.430	47.7	0.137	34.9	0.337	-81.9	1.160	7.76
2.4	0.662	-153.9	1.377	45.5	0.140	35.9	0.334	-83.9	1.173	7.40
2.5	0.665	-151.5	1.329	43.6	0.143	37.2	0.335	-86.0	1.180	7.10
2.6	0.666	-149.1	1.279	41.8	0.146	38.3	0.334	-88.2	1.207	6.68
2.7	0.667	-147.0	1.236	39.7	0.150	39.1	0.334	-90.8	1.217	6.35
2.8	0.668	-144.5	1.185	38.1	0.154	39.8	0.334	-93.1	1.240	5.91
2.9	0.657	-141.6	1.135	35.6	0.160	39.8	0.332	-96.1	1.291	5.26
3.0	0.651	-138.5	1.096	33.1	0.167	40.6	0.331	-99.2	1.318	4.79
4.0	0.699	-123.2	0.858	17.3	0.217	44.4	0.372	-131.4	1.188	3.35
5.0	0.730	-102.5	0.660	4.6	0.289	35.2	0.446	-158.8	1.110	1.56

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	0.884	-32.2	12.773	159.4	0.033	73.9	0.946	-16.4	0.066	25.84
0.2	0.817	-61.2	11.148	141.8	0.061	60.3	0.826	-30.2	0.147	22.64
0.3	0.735	-85.5	9.420	127.8	0.078	49.9	0.704	-40.1	0.240	20.84
0.4	0.682	-104.3	7.946	116.8	0.088	43.8	0.596	-47.2	0.324	19.55
0.5	0.654	-119.4	6.846	108.4	0.095	39.4	0.514	-52.1	0.393	18.58
0.6	0.628	-132.2	5.914	101.6	0.099	36.6	0.447	-56.1	0.472	17.74
0.7	0.614	-142.6	5.188	96.0	0.103	34.8	0.397	-59.2	0.543	17.03
0.8	0.603	-151.5	4.596	91.3	0.105	33.8	0.356	-62.1	0.616	16.41
0.9	0.600	-158.8	4.108	86.9	0.108	33.3	0.327	-64.9	0.677	15.80
1.0	0.600	-165.2	3.733	83.0	0.110	33.5	0.303	-67.7	0.736	15.32
1.1	0.599	-171.0	3.410	79.4	0.112	33.5	0.286	-70.4	0.792	14.84
1.2	0.604	-176.2	3.123	76.1	0.114	33.9	0.272	-73.0	0.839	14.37
1.3	0.609	-179.6	2.891	73.1	0.116	34.4	0.264	-75.7	0.878	13.95
1.4	0.612	-176.0	2.690	70.2	0.119	35.1	0.256	-78.2	0.922	13.56
1.5	0.615	-172.6	2.512	67.4	0.121	35.8	0.252	-80.3	0.958	13.18
1.6	0.618	-169.5	2.361	64.7	0.124	36.6	0.247	-82.7	0.993	12.81
1.7	0.624	-166.8	2.217	62.3	0.126	37.3	0.247	-84.5	1.017	11.64
1.8	0.624	-164.2	2.098	59.7	0.129	38.3	0.243	-86.5	1.052	10.71
1.9	0.625	-161.7	1.989	57.6	0.132	39.0	0.245	-87.9	1.078	10.07
2.0	0.628	-159.3	1.894	55.1	0.135	39.9	0.242	-89.7	1.102	9.51
2.1	0.635	-157.0	1.818	53.3	0.139	40.8	0.244	-91.4	1.101	9.22
2.2	0.634	-155.0	1.741	51.3	0.143	41.3	0.241	-93.1	1.126	8.70
2.3	0.637	-152.7	1.672	49.5	0.147	42.0	0.243	-94.7	1.130	8.36
2.4	0.637	-150.6	1.610	47.2	0.152	42.3	0.241	-96.6	1.142	7.97
2.5	0.640	-148.6	1.552	45.4	0.157	43.0	0.242	-98.7	1.142	7.67
2.6	0.643	-146.3	1.496	43.6	0.161	43.3	0.241	-100.8	1.152	7.31
2.7	0.643	-144.2	1.442	41.8	0.166	43.5	0.241	-103.4	1.165	6.93
2.8	0.642	-141.9	1.388	40.3	0.171	43.5	0.241	-105.8	1.182	6.51
2.9	0.634	-139.2	1.328	37.7	0.178	42.9	0.242	-109.0	1.213	5.95
3.0	0.626	-136.4	1.282	35.4	0.185	42.9	0.243	-112.1	1.236	5.48
4.0	0.678	-122.1	1.005	19.4	0.232	43.0	0.298	-143.6	1.151	4.01
5.0	0.714	-102.5	0.776	5.7	0.295	33.1	0.379	-167.1	1.095	2.33

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	0.841	-38.1	15.815	156.7	0.034	68.6	0.925	-19.9	0.131	26.68
0.2	0.770	-68.5	13.281	137.6	0.057	57.5	0.778	-35.8	0.190	23.68
0.3	0.692	-94.2	10.864	123.6	0.071	48.9	0.641	-46.5	0.282	21.84
0.4	0.641	-113.0	8.964	113.1	0.080	43.2	0.530	-54.2	0.381	20.51
0.5	0.619	-127.6	7.608	105.3	0.086	40.1	0.448	-59.3	0.458	19.48
0.6	0.598	-139.6	6.522	98.8	0.090	38.6	0.383	-63.9	0.544	18.62
0.7	0.588	-149.5	5.686	93.7	0.093	37.6	0.336	-67.4	0.620	17.86
0.8	0.583	-157.7	5.030	89.4	0.097	37.3	0.299	-71.2	0.688	17.16
0.9	0.583	-164.4	4.483	85.3	0.100	37.5	0.273	-74.5	0.748	16.52
1.0	0.584	-170.4	4.049	81.7	0.103	38.1	0.251	-78.0	0.805	15.95
1.1	0.585	-175.7	3.698	78.5	0.106	38.6	0.237	-81.4	0.853	15.42
1.2	0.589	179.7	3.381	75.5	0.110	39.1	0.225	-84.6	0.896	14.89
1.3	0.595	175.9	3.129	72.7	0.113	39.8	0.218	-87.6	0.931	14.44
1.4	0.597	172.3	2.911	69.9	0.116	40.4	0.212	-90.6	0.966	13.98
1.5	0.604	169.3	2.715	67.3	0.120	41.2	0.209	-92.9	0.991	13.56
1.6	0.607	166.5	2.552	64.8	0.123	41.8	0.205	-95.6	1.015	12.39
1.7	0.611	163.9	2.395	62.6	0.127	42.4	0.206	-97.3	1.037	11.57
1.8	0.614	161.5	2.267	60.2	0.131	43.2	0.202	-99.5	1.060	10.88
1.9	0.614	159.1	2.150	58.1	0.136	43.6	0.205	-100.8	1.079	10.29
2.0	0.616	157.1	2.047	55.7	0.140	44.2	0.201	-102.7	1.097	9.76
2.1	0.621	155.0	1.965	53.9	0.145	44.8	0.203	-104.1	1.094	9.47
2.2	0.620	153.0	1.882	52.1	0.149	45.0	0.200	-106.0	1.113	8.96
2.3	0.624	150.9	1.804	50.3	0.154	45.2	0.202	-107.3	1.114	8.62
2.4	0.625	148.6	1.740	48.3	0.160	45.3	0.199	-109.3	1.120	8.26
2.5	0.628	146.5	1.676	46.4	0.165	45.6	0.201	-111.3	1.120	7.96
2.6	0.630	144.7	1.617	44.8	0.170	45.6	0.200	-113.4	1.124	7.64
2.7	0.630	142.7	1.557	42.9	0.176	45.4	0.201	-116.1	1.135	7.24
2.8	0.630	140.4	1.502	41.2	0.181	45.0	0.201	-118.6	1.148	6.86
2.9	0.620	138.0	1.434	38.9	0.188	44.1	0.204	-121.8	1.177	6.27
3.0	0.614	135.1	1.385	36.7	0.195	43.9	0.205	-124.7	1.198	5.83
4.0	0.668	121.4	1.086	21.0	0.242	42.2	0.269	-154.2	1.130	4.34
5.0	0.704	102.3	0.841	7.0	0.299	31.7	0.352	-174.3	1.093	2.63

V_{CE} = 2 V, I_c = 10 mA, Z_o = 50 Ω

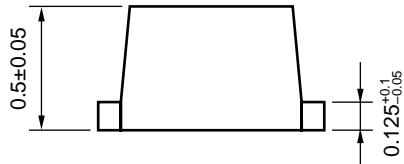
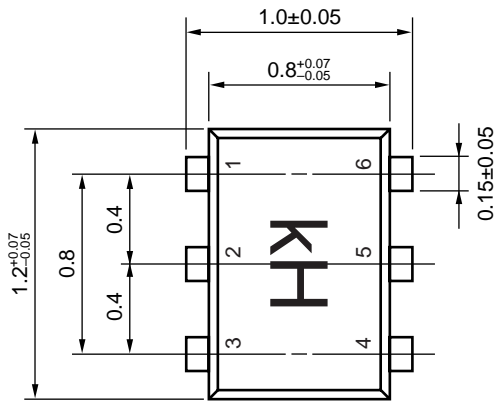
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.792	-43.7	19.358	153.1	0.032	68.6	0.894	-24.2	0.134	27.78
0.2	0.720	-78.0	15.514	133.0	0.053	55.6	0.720	-42.1	0.225	24.70
0.3	0.642	-104.1	12.302	119.1	0.064	47.7	0.571	-53.6	0.346	22.82
0.4	0.606	-122.4	9.911	109.3	0.071	43.7	0.461	-61.8	0.448	21.42
0.5	0.588	-136.0	8.295	102.0	0.077	41.7	0.384	-67.5	0.537	20.34
0.6	0.573	-147.4	7.048	96.2	0.081	41.5	0.325	-72.8	0.626	19.40
0.7	0.567	-156.5	6.125	91.5	0.085	41.2	0.283	-77.1	0.700	18.57
0.8	0.566	-164.0	5.393	87.5	0.089	41.7	0.250	-82.0	0.768	17.84
0.9	0.565	-169.9	4.799	83.8	0.093	42.2	0.228	-86.3	0.825	17.11
1.0	0.570	-175.3	4.332	80.6	0.097	43.0	0.211	-90.8	0.872	16.49
1.1	0.572	179.8	3.941	77.6	0.102	43.7	0.200	-95.0	0.914	15.89
1.2	0.579	175.6	3.608	74.8	0.106	44.2	0.191	-99.1	0.947	15.32
1.3	0.586	172.1	3.333	72.1	0.110	45.0	0.187	-102.5	0.972	14.80
1.4	0.590	169.0	3.099	69.6	0.115	45.5	0.183	-106.0	0.996	14.31
1.5	0.592	166.1	2.893	67.2	0.119	46.1	0.182	-108.4	1.020	12.97
1.6	0.597	163.5	2.718	64.9	0.124	46.6	0.180	-111.5	1.037	12.23
1.7	0.600	161.2	2.550	62.7	0.129	47.0	0.181	-113.1	1.053	11.55
1.8	0.604	159.0	2.412	60.5	0.134	47.6	0.178	-115.6	1.068	10.97
1.9	0.604	156.6	2.287	58.4	0.139	47.7	0.180	-116.7	1.081	10.42
2.0	0.607	154.5	2.179	56.1	0.144	48.0	0.177	-118.6	1.092	9.95
2.1	0.610	153.0	2.090	54.6	0.149	48.3	0.178	-119.9	1.092	9.61
2.2	0.610	150.9	2.002	52.7	0.155	48.2	0.176	-121.9	1.103	9.16
2.3	0.614	149.0	1.919	51.0	0.161	48.1	0.178	-123.2	1.101	8.84
2.4	0.613	146.9	1.851	49.0	0.167	47.9	0.176	-125.2	1.107	8.47
2.5	0.618	145.0	1.781	47.3	0.173	47.8	0.177	-127.1	1.102	8.19
2.6	0.621	143.2	1.717	45.6	0.178	47.6	0.176	-129.2	1.106	7.86
2.7	0.619	141.1	1.657	43.7	0.184	47.3	0.178	-132.0	1.117	7.47
2.8	0.618	138.8	1.592	42.2	0.189	46.6	0.180	-134.4	1.132	7.04
2.9	0.610	136.7	1.521	40.0	0.197	45.5	0.184	-137.3	1.153	6.50
3.0	0.603	133.8	1.471	37.9	0.204	45.0	0.186	-140.1	1.171	6.07
4.0	0.658	120.7	1.154	22.5	0.250	41.8	0.258	-165.5	1.117	4.56
5.0	0.695	102.2	0.898	8.3	0.304	30.7	0.339	177.8	1.089	2.88

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

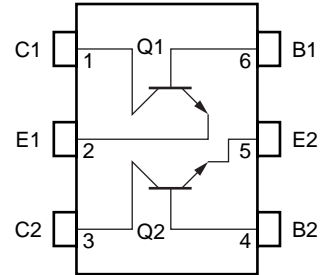
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.696	-58.8	26.734	145.0	0.030	62.3	0.816	-34.0	0.223	29.50
0.2	0.621	-98.8	19.291	123.6	0.043	51.4	0.592	-55.5	0.340	26.49
0.3	0.574	-124.2	14.365	111.1	0.052	47.9	0.442	-68.2	0.484	24.45
0.4	0.554	-140.9	11.256	102.6	0.058	47.1	0.347	-77.6	0.603	22.91
0.5	0.551	-152.0	9.232	96.4	0.063	47.4	0.284	-84.8	0.696	21.67
0.6	0.545	-161.3	7.772	91.7	0.068	48.4	0.240	-92.5	0.781	20.56
0.7	0.546	-168.2	6.696	87.8	0.073	49.2	0.211	-98.9	0.845	19.60
0.8	0.550	-174.4	5.880	84.5	0.079	50.3	0.191	-106.3	0.896	18.72
0.9	0.555	-179.4	5.213	81.3	0.085	51.1	0.179	-112.3	0.935	17.88
1.0	0.562	176.4	4.692	78.5	0.091	52.0	0.171	-118.6	0.965	17.14
1.1	0.565	172.3	4.269	75.9	0.096	52.4	0.169	-123.5	0.992	16.47
1.2	0.572	168.8	3.896	73.4	0.102	52.9	0.167	-128.4	1.013	15.12
1.3	0.580	166.0	3.597	71.0	0.108	53.3	0.168	-131.8	1.024	14.27
1.4	0.582	163.2	3.343	68.8	0.114	53.5	0.169	-135.3	1.039	13.45
1.5	0.588	160.6	3.114	66.6	0.120	53.8	0.170	-137.4	1.050	12.77
1.6	0.592	158.7	2.929	64.4	0.126	53.8	0.171	-140.3	1.055	12.22
1.7	0.596	156.5	2.748	62.5	0.132	53.9	0.173	-141.4	1.063	11.65
1.8	0.596	154.7	2.597	60.4	0.138	53.8	0.173	-144.1	1.076	11.06
1.9	0.599	152.8	2.464	58.6	0.144	53.5	0.175	-144.7	1.078	10.63
2.0	0.603	151.0	2.347	56.4	0.150	53.5	0.173	-146.9	1.080	10.22
2.1	0.604	149.2	2.249	54.9	0.156	53.2	0.174	-147.9	1.082	9.83
2.2	0.602	147.7	2.157	53.3	0.163	52.8	0.173	-150.0	1.089	9.40
2.3	0.608	145.8	2.065	51.6	0.170	52.3	0.174	-151.0	1.083	9.10
2.4	0.607	143.8	1.992	49.7	0.176	51.8	0.173	-153.1	1.085	8.75
2.5	0.612	142.2	1.917	48.1	0.183	51.3	0.175	-154.7	1.080	8.48
2.6	0.609	140.5	1.848	46.5	0.189	50.7	0.175	-157.1	1.091	8.07
2.7	0.612	138.6	1.781	44.8	0.195	50.1	0.178	-159.0	1.093	7.75
2.8	0.611	136.6	1.717	43.3	0.201	49.1	0.181	-161.2	1.100	7.39
2.9	0.602	134.3	1.640	41.1	0.209	47.6	0.187	-162.9	1.120	6.83
3.0	0.595	131.5	1.582	39.1	0.216	46.8	0.190	-165.1	1.136	6.40
4.0	0.648	119.5	1.239	24.3	0.262	41.8	0.267	177.6	1.100	4.82
5.0	0.687	101.4	0.965	10.3	0.312	29.7	0.341	165.7	1.085	3.13

PACKAGE DIMENSIONS

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



(Top View)



PIN CONNECTIONS

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

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