

DATA SHEET

NEC

NPN SILICON RF TRANSISTOR 2SC5653

NPN SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW NOISE 3-PIN NON-LEAD MINIMOLD

FEATURES

- 1006 package employed (1.0 × 0.6 × 0.5 mm)
- NF = 1.3 dB TYP. @ $V_{CE} = 2\text{ V}$, $I_c = 3\text{ mA}$, $f = 2\text{ GHz}$
- $|S_{21e}|^2 = 10.0\text{ dB TYP. @ } V_{CE} = 2\text{ V}$, $I_c = 20\text{ mA}$, $f = 2\text{ GHz}$

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC5653	50 pcs (Non reel)	<ul style="list-style-type: none"> • 8 mm wide paper carrier taping • Pin 3 (Collector) face the perforation side of the tape
2SC5653-T1	10 kpcs/reel	

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}	5	V
Collector to Emitter Voltage	V_{CEO}	3	V
Emitter to Base Voltage	V_{EBO}	2	V
Collector Current	I_c	30	mA
Total Power Dissipation	P_{tot} ^{Note}	90	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
DC Characteristics						
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	–	–	100	nA
Emitter Cut-off Current	I _{EBO}	V _{BE} = 1 V, I _C = 0 mA	–	–	100	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 2 V, I _C = 20 mA	70	–	130	–
RF Characteristics						
Gain Bandwidth Product (1)	f _T	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	7.0	9.0	–	GHz
Gain Bandwidth Product (2)	f _T	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	9.0	11.0	–	GHz
Insertion Power Gain (1)	S _{21e} ²	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	6.0	7.5	–	dB
Insertion Power Gain (2)	S _{21e} ²	V _{CE} = 2 V, I _C = 20 mA, f = 2 GHz	8.5	10.0	–	dB
Noise Figure (1)	NF	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.3	2.0	dB
Noise Figure (2)	NF	V _{CE} = 2 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.3	2.0	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz	–	0.4	0.8	pF

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

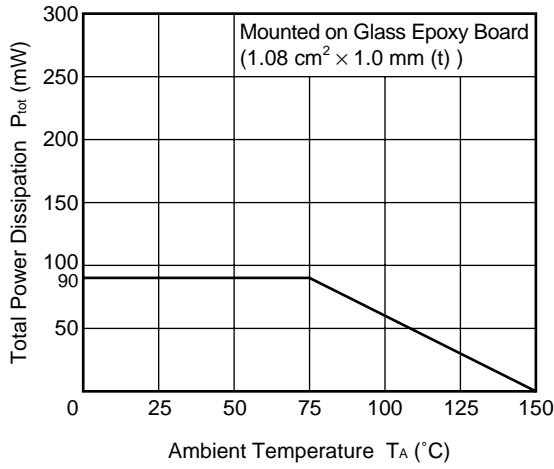
2. Collector to base capacitance measured using capacitance meter (self-balancing bridge method) when the emitter is connected to the guard pin

h_{FE} CLASSIFICATION

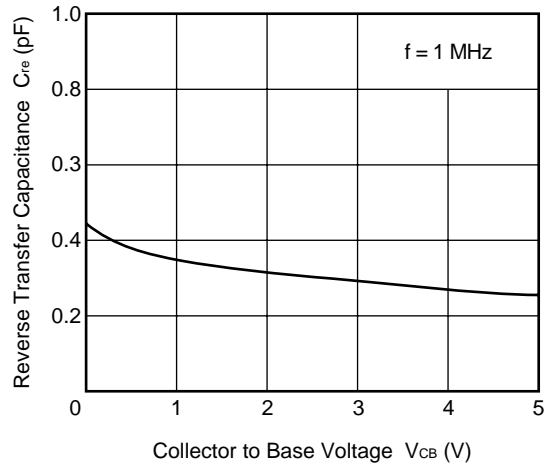
Rank	EB	FB
Marking	F	
h _{FE} Value	70 to 100	90 to 130

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

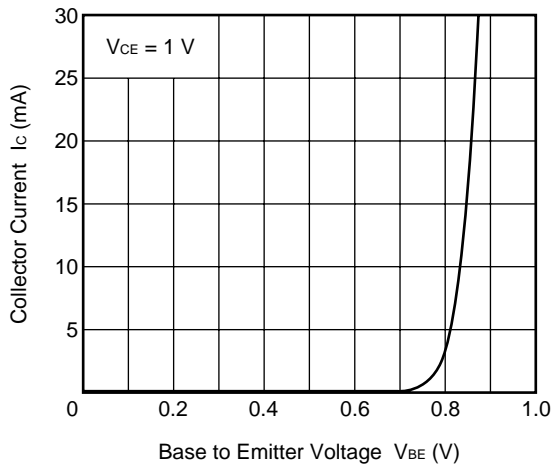
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



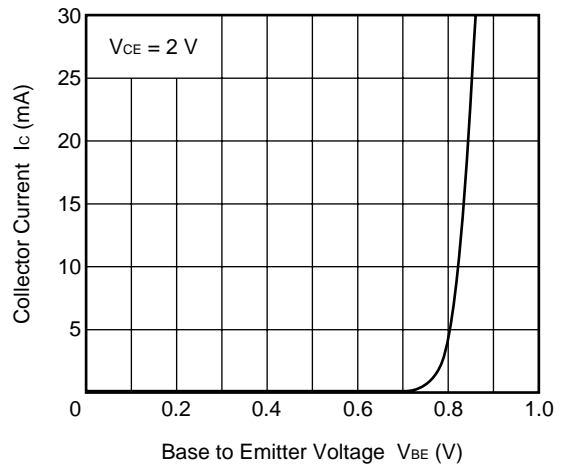
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



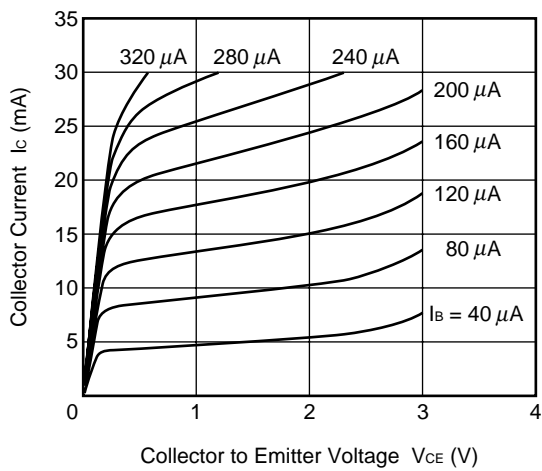
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



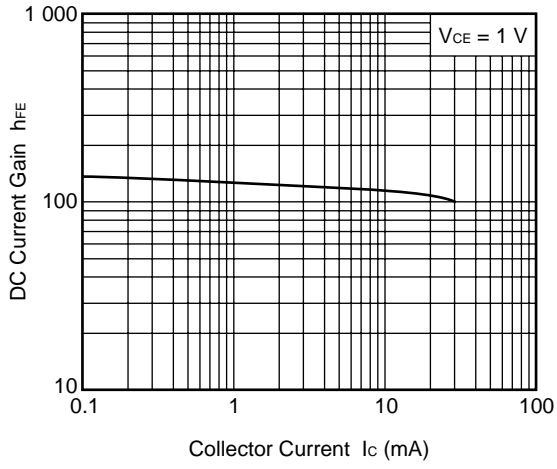
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



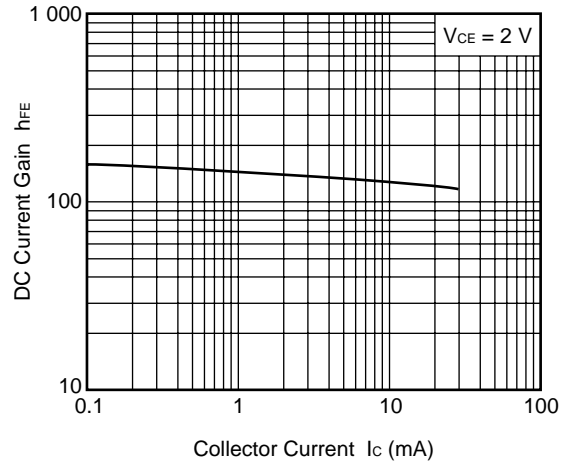
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



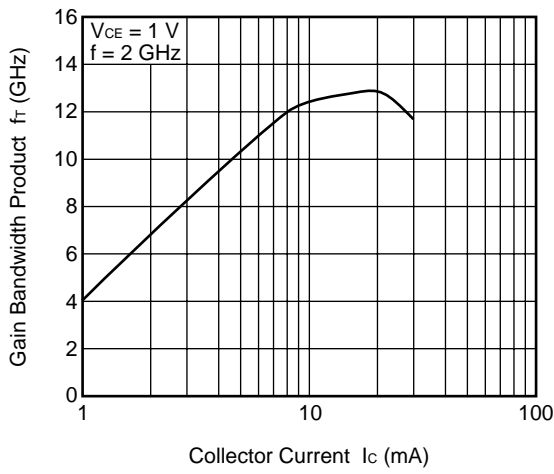
DC CURRENT GAIN vs.
COLLECTOR CURRENT



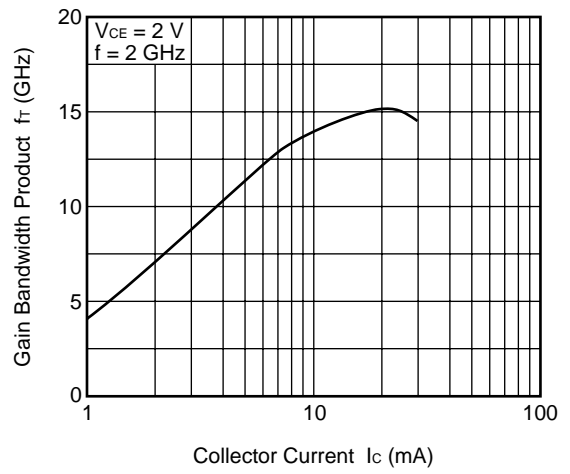
DC CURRENT GAIN vs.
COLLECTOR CURRENT



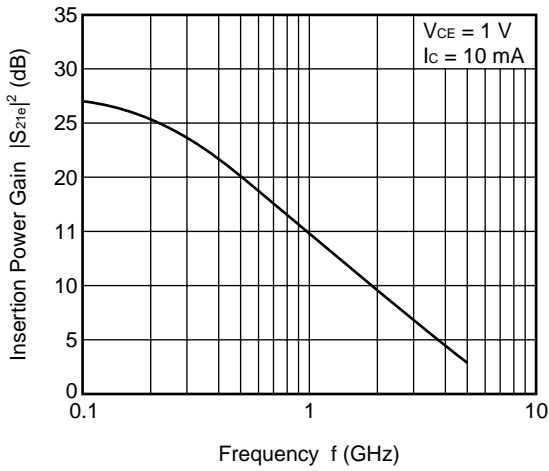
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



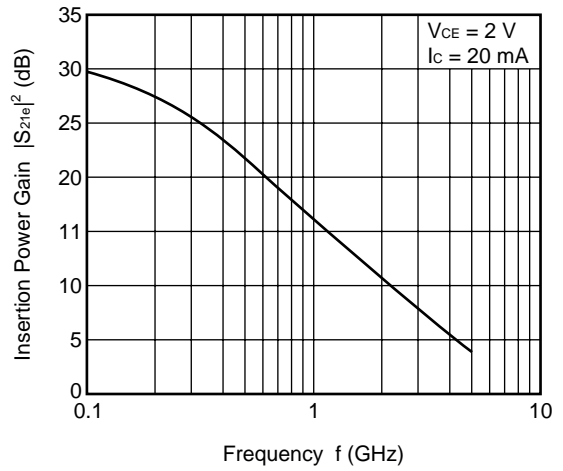
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



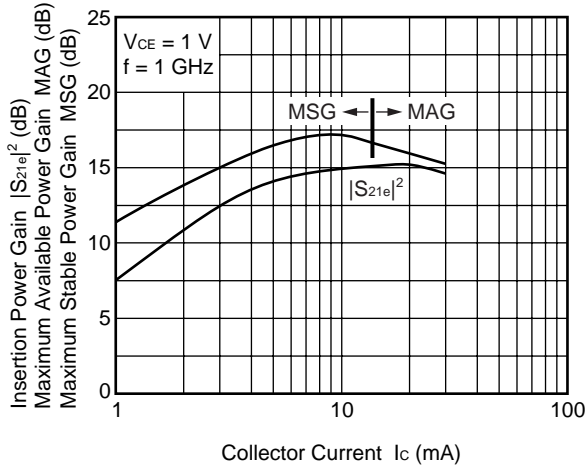
INSERTION POWER GAIN vs. FREQUENCY



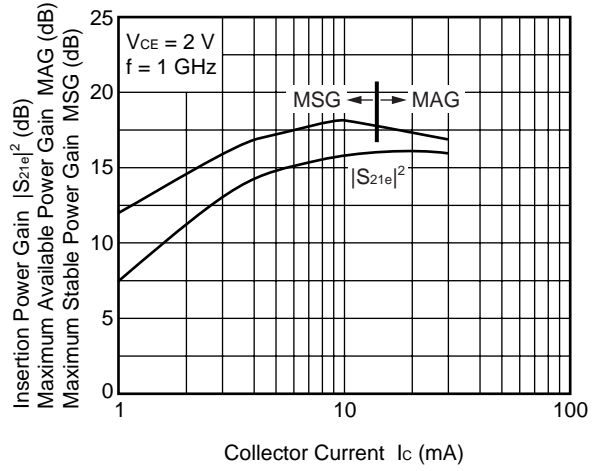
INSERTION POWER GAIN vs. FREQUENCY



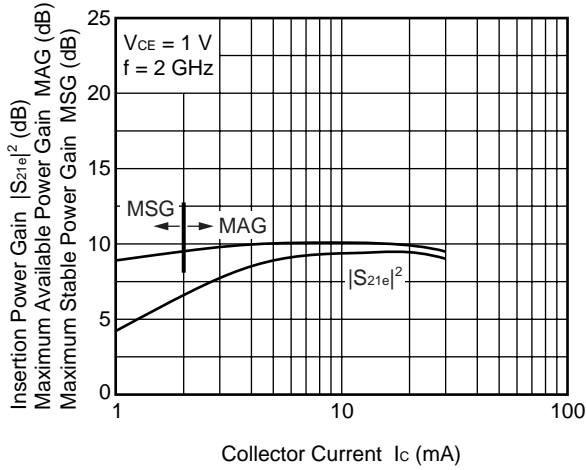
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



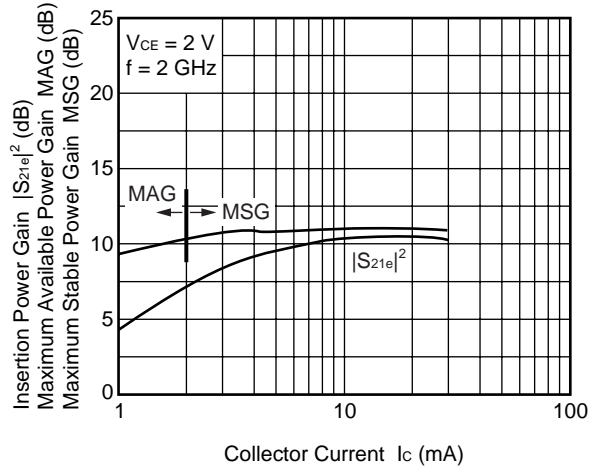
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



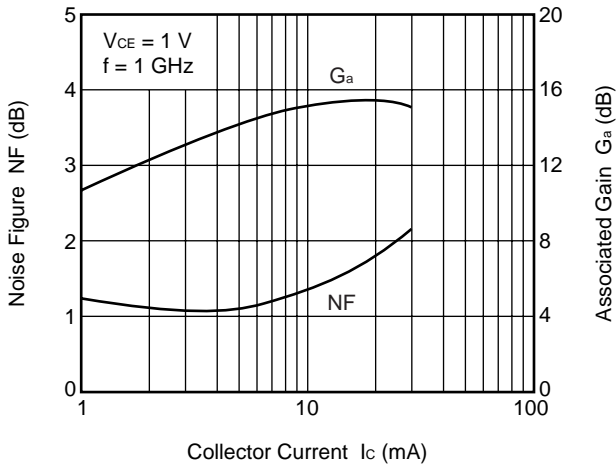
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



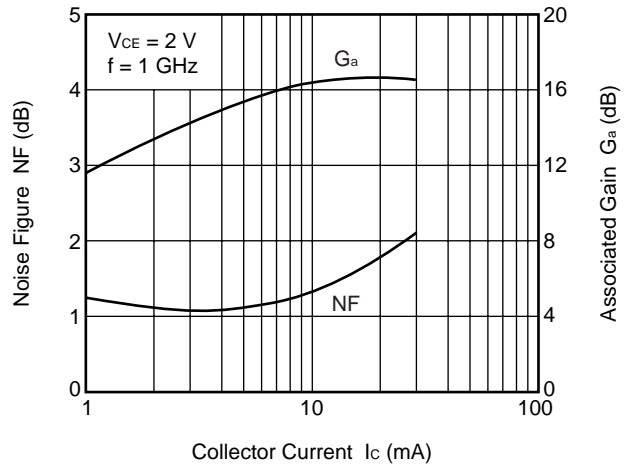
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



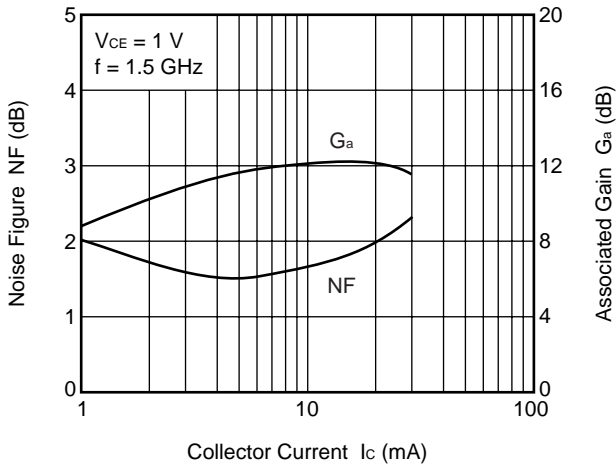
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



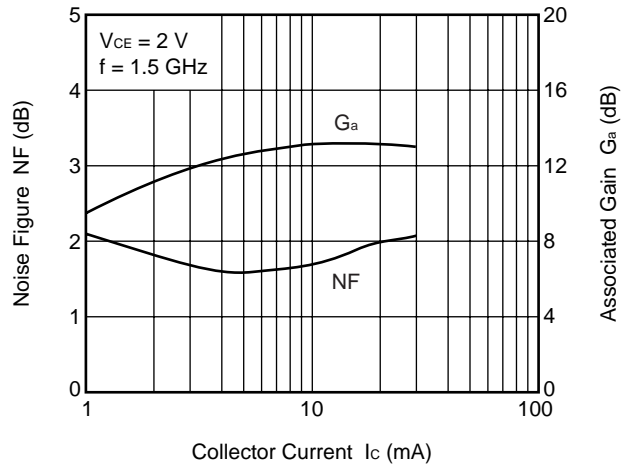
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



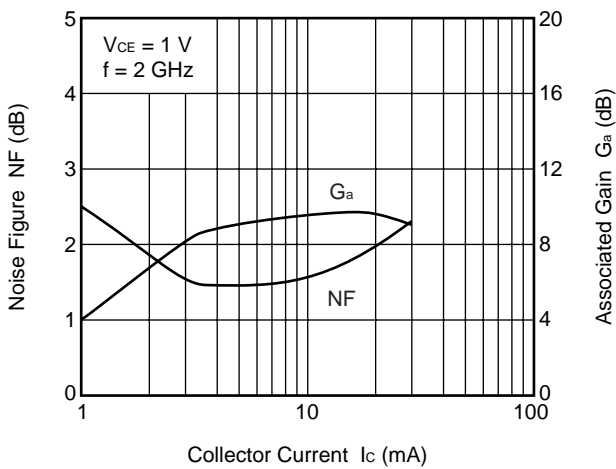
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



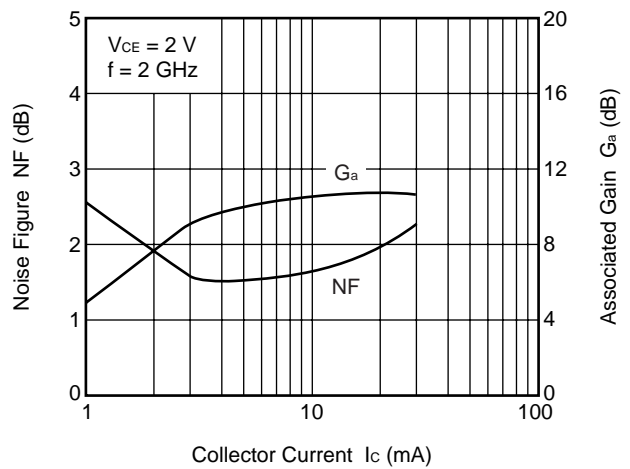
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



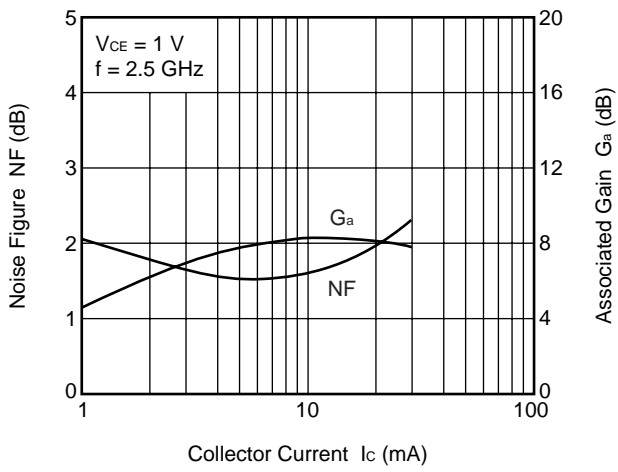
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



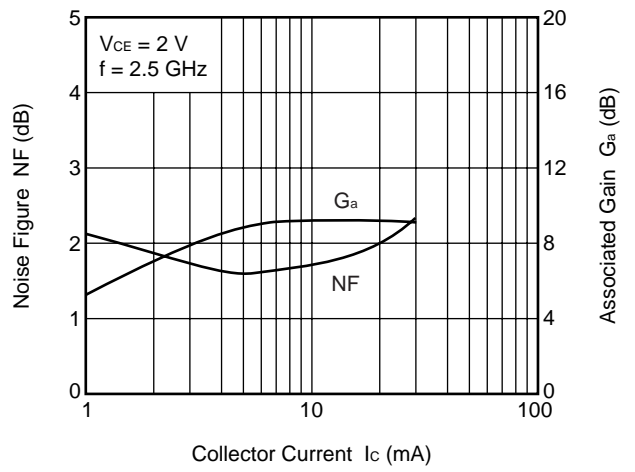
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

When $K < 1$, the MSG (Maximum Stable Gain) is used. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG ^{Note} (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.961	-7.3	3.492	170.9	0.026	84.6	0.990	-4.8	0.09	21.32
0.2	0.952	-16.1	3.389	163.8	0.050	79.3	0.975	-9.5	0.12	18.31
0.3	0.926	-24.0	3.252	157.4	0.073	73.8	0.950	-14.0	0.16	16.50
0.4	0.912	-31.8	3.183	150.8	0.094	68.9	0.923	-18.6	0.19	15.30
0.5	0.878	-39.2	3.061	144.0	0.113	64.1	0.893	-22.7	0.24	14.32
0.6	0.842	-45.8	2.920	137.5	0.129	60.3	0.857	-26.5	0.29	13.54
0.7	0.811	-52.0	2.797	131.7	0.143	56.6	0.821	-30.0	0.34	12.91
0.8	0.775	-57.7	2.663	126.7	0.155	53.5	0.789	-32.9	0.38	12.36
0.9	0.741	-63.1	2.521	122.2	0.165	50.6	0.759	-35.7	0.42	11.85
1.0	0.714	-68.0	2.398	117.6	0.172	48.2	0.729	-38.1	0.47	11.44
1.1	0.693	-72.4	2.283	113.7	0.179	46.2	0.705	-40.2	0.50	11.05
1.2	0.666	-76.8	2.196	109.9	0.185	44.4	0.681	-42.1	0.54	10.75
1.3	0.644	-80.7	2.094	105.9	0.190	42.9	0.665	-43.8	0.58	10.42
1.4	0.622	-84.5	2.014	102.7	0.194	41.6	0.646	-45.2	0.63	10.17
1.5	0.603	-87.8	1.928	99.9	0.197	40.4	0.630	-46.5	0.66	9.90
1.6	0.589	-91.0	1.864	96.8	0.201	39.6	0.616	-47.6	0.70	9.68
1.7	0.571	-93.7	1.786	94.1	0.204	38.7	0.604	-48.2	0.74	9.43
1.8	0.554	-96.7	1.754	91.8	0.206	38.3	0.585	-49.5	0.78	9.29
1.9	0.538	-99.5	1.680	89.1	0.209	37.6	0.575	-50.1	0.82	9.06
2.0	0.522	-102.1	1.627	86.7	0.212	37.4	0.561	-50.6	0.86	8.85
2.1	0.507	-104.7	1.593	83.9	0.215	37.3	0.547	-51.1	0.90	8.70
2.2	0.493	-107.2	1.556	81.8	0.216	37.5	0.533	-52.1	0.93	8.58
2.3	0.478	-110.1	1.524	79.3	0.218	37.7	0.522	-52.9	0.97	8.45
2.4	0.466	-112.6	1.484	77.3	0.219	37.5	0.508	-53.6	1.01	7.70
2.5	0.450	-115.6	1.467	75.0	0.221	37.6	0.491	-54.7	1.05	6.91
2.6	0.437	-118.6	1.433	73.0	0.223	37.3	0.478	-56.0	1.08	6.32
2.7	0.424	-121.4	1.409	70.6	0.225	37.6	0.469	-57.5	1.11	5.95
2.8	0.410	-124.6	1.390	68.6	0.226	37.9	0.456	-58.9	1.14	5.60
2.9	0.401	-127.8	1.365	67.0	0.228	38.1	0.442	-59.7	1.17	5.26
3.0	0.390	-131.2	1.342	64.9	0.228	38.3	0.427	-62.1	1.21	4.92
4.0	0.379	-165.4	1.136	46.4	0.263	44.1	0.306	-81.0	1.34	2.86
5.0	0.407	179.4	0.994	33.2	0.322	47.5	0.206	-114.6	1.33	1.47

$V_{CE} = 1\text{ V}$, $I_C = 3\text{ mA}$, $Z_0 = 50\ \Omega$

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	0.898	-14.5	9.478	165.4	0.026	81.8	0.958	-9.6	0.13	25.69
0.2	0.858	-27.7	8.872	154.9	0.047	74.3	0.909	-18.6	0.19	22.80
0.3	0.794	-39.3	8.100	145.0	0.065	67.4	0.838	-26.3	0.27	20.98
0.4	0.739	-50.5	7.486	136.2	0.080	62.3	0.767	-32.8	0.34	19.71
0.5	0.679	-60.5	6.781	128.4	0.092	58.4	0.699	-37.9	0.41	18.67
0.6	0.620	-68.2	6.135	121.4	0.102	55.6	0.636	-42.1	0.49	17.81
0.7	0.575	-75.1	5.593	115.7	0.110	53.8	0.582	-45.5	0.55	17.08
0.8	0.527	-81.1	5.119	111.0	0.116	52.3	0.537	-47.9	0.62	16.43
0.9	0.497	-86.4	4.670	107.4	0.123	51.6	0.501	-50.0	0.67	15.81
1.0	0.466	-91.3	4.318	103.6	0.128	51.2	0.467	-51.6	0.73	15.26
1.1	0.446	-95.1	4.011	100.4	0.134	51.0	0.440	-52.8	0.77	14.76
1.2	0.426	-99.1	3.764	97.4	0.139	50.9	0.419	-53.7	0.81	14.32
1.3	0.406	-102.9	3.525	94.3	0.144	50.9	0.401	-54.3	0.86	13.87
1.4	0.391	-105.9	3.329	91.7	0.149	51.3	0.384	-54.6	0.89	13.48
1.5	0.375	-108.5	3.142	89.5	0.155	51.4	0.371	-54.7	0.93	13.08
1.6	0.363	-111.0	2.986	87.0	0.160	51.7	0.360	-54.4	0.96	12.70
1.7	0.351	-112.9	2.835	85.0	0.166	51.9	0.350	-53.8	0.99	12.34
1.8	0.338	-114.8	2.720	83.0	0.171	52.4	0.337	-53.8	1.01	11.33
1.9	0.328	-117.3	2.594	81.0	0.177	52.5	0.329	-53.1	1.04	10.51
2.0	0.317	-119.2	2.488	79.2	0.184	52.8	0.319	-52.3	1.06	9.86
2.1	0.308	-121.4	2.404	76.9	0.190	53.2	0.310	-51.8	1.07	9.39
2.2	0.300	-124.0	2.324	75.3	0.196	53.5	0.298	-51.6	1.09	8.94
2.3	0.291	-125.7	2.245	73.3	0.202	53.8	0.290	-51.4	1.10	8.50
2.4	0.283	-127.7	2.171	71.6	0.208	53.8	0.280	-51.1	1.12	8.08
2.5	0.274	-130.6	2.117	69.8	0.214	53.9	0.268	-51.2	1.13	7.75
2.6	0.268	-133.7	2.049	68.1	0.221	53.5	0.258	-51.7	1.14	7.39
2.7	0.260	-135.7	1.997	66.2	0.227	53.7	0.248	-52.4	1.15	7.08
2.8	0.253	-139.0	1.953	64.6	0.233	53.7	0.238	-53.3	1.16	6.82
2.9	0.250	-141.7	1.900	63.2	0.240	53.5	0.226	-53.7	1.17	6.52
3.0	0.245	-145.2	1.851	61.6	0.246	53.4	0.216	-55.5	1.18	6.24
4.0	0.288	-176.1	1.491	46.6	0.314	50.9	0.103	-69.3	1.17	4.24
5.0	0.338	173.9	1.275	34.5	0.379	46.4	0.004	161.7	1.16	2.86

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.826	-19.9	14.291	161.3	0.024	80.0	0.923	-13.6	0.18	27.75
0.2	0.758	-36.5	12.811	147.6	0.043	71.6	0.839	-25.4	0.27	24.71
0.3	0.674	-50.6	11.168	136.3	0.058	64.8	0.736	-34.6	0.38	22.85
0.4	0.607	-62.8	9.835	127.1	0.070	60.2	0.644	-41.4	0.47	21.49
0.5	0.540	-73.3	8.590	119.3	0.079	58.1	0.566	-46.3	0.56	20.34
0.6	0.483	-81.1	7.559	113.1	0.087	56.8	0.500	-49.8	0.64	19.38
0.7	0.441	-88.1	6.735	107.7	0.094	56.4	0.446	-52.4	0.71	18.53
0.8	0.404	-93.7	6.068	103.7	0.101	56.3	0.405	-54.2	0.78	17.78
0.9	0.381	-98.5	5.466	100.6	0.108	56.4	0.374	-55.6	0.82	17.04
1.0	0.359	-103.1	5.014	97.4	0.114	56.6	0.346	-56.7	0.87	16.42
1.1	0.346	-106.9	4.614	94.8	0.121	57.0	0.323	-57.3	0.91	15.82
1.2	0.331	-110.8	4.296	91.9	0.127	57.3	0.306	-57.6	0.94	15.28
1.3	0.314	-114.0	4.008	89.4	0.134	57.7	0.291	-57.2	0.97	14.76
1.4	0.301	-116.5	3.767	87.2	0.141	58.2	0.278	-56.7	0.99	14.28
1.5	0.290	-118.8	3.541	85.2	0.148	58.5	0.268	-56.0	1.02	13.03
1.6	0.282	-120.3	3.351	83.0	0.155	58.8	0.261	-54.8	1.03	12.25
1.7	0.276	-122.1	3.178	81.3	0.162	58.9	0.254	-53.5	1.05	11.60
1.8	0.264	-123.9	3.029	79.4	0.169	59.2	0.245	-52.4	1.06	10.98
1.9	0.259	-125.5	2.886	77.7	0.176	59.1	0.240	-50.9	1.08	10.46
2.0	0.250	-127.1	2.760	76.1	0.184	59.1	0.233	-49.4	1.09	9.95
2.1	0.244	-128.8	2.658	74.0	0.192	59.2	0.226	-48.1	1.09	9.54
2.2	0.239	-130.5	2.560	72.6	0.199	59.3	0.219	-47.2	1.10	9.14
2.3	0.231	-132.7	2.469	70.9	0.207	59.3	0.213	-46.3	1.11	8.75
2.4	0.225	-134.3	2.383	69.2	0.214	59.0	0.205	-45.5	1.12	8.38
2.5	0.220	-137.6	2.318	67.7	0.222	58.8	0.196	-45.0	1.12	8.08
2.6	0.217	-140.0	2.237	66.2	0.230	58.2	0.187	-44.6	1.13	7.73
2.7	0.212	-141.6	2.174	64.5	0.237	58.0	0.178	-45.1	1.13	7.43
2.8	0.206	-145.1	2.121	63.0	0.244	57.7	0.170	-45.6	1.13	7.17
2.9	0.204	-148.4	2.060	61.7	0.252	57.3	0.160	-45.7	1.14	6.88
3.0	0.202	-150.9	2.003	60.4	0.258	56.9	0.150	-47.0	1.14	6.60
4.0	0.267	179.6	1.593	46.4	0.331	52.1	0.044	-45.9	1.13	4.61
5.0	0.323	171.7	1.354	35.2	0.396	46.0	0.064	77.8	1.12	3.23

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.759	-22.9	18.053	157.8	0.023	78.4	0.893	-17.0	0.24	28.96
0.2	0.689	-43.8	15.633	142.3	0.041	69.9	0.778	-30.5	0.33	25.86
0.3	0.589	-58.9	13.096	130.4	0.053	63.8	0.656	-40.1	0.46	23.90
0.4	0.514	-71.9	11.173	121.2	0.064	60.8	0.556	-46.9	0.57	22.45
0.5	0.452	-82.1	9.537	113.9	0.072	59.5	0.477	-51.2	0.66	21.21
0.6	0.401	-90.4	8.291	108.2	0.080	59.4	0.415	-54.2	0.74	20.18
0.7	0.366	-96.9	7.286	103.4	0.087	59.6	0.366	-56.3	0.81	19.23
0.8	0.336	-102.3	6.516	99.9	0.094	59.9	0.330	-57.6	0.87	18.40
0.9	0.318	-106.7	5.846	97.0	0.102	60.2	0.303	-58.6	0.91	17.59
1.0	0.302	-111.5	5.328	94.2	0.109	60.8	0.279	-59.3	0.94	16.90
1.1	0.292	-114.7	4.908	91.8	0.116	61.2	0.260	-59.5	0.97	16.25
1.2	0.281	-118.4	4.547	89.3	0.123	61.5	0.245	-59.3	0.99	15.66
1.3	0.266	-121.6	4.232	86.8	0.131	61.9	0.233	-58.2	1.02	14.29
1.4	0.256	-123.9	3.961	84.8	0.139	62.3	0.223	-57.1	1.03	13.43
1.5	0.249	-125.8	3.725	83.0	0.146	62.3	0.215	-55.8	1.05	12.71
1.6	0.243	-127.1	3.522	81.0	0.154	62.5	0.210	-54.1	1.06	12.12
1.7	0.238	-128.4	3.335	79.4	0.162	62.5	0.205	-51.9	1.07	11.54
1.8	0.228	-130.2	3.174	77.6	0.170	62.5	0.198	-50.3	1.08	11.00
1.9	0.222	-130.6	3.022	76.0	0.178	62.3	0.195	-48.3	1.09	10.50
2.0	0.217	-132.4	2.887	74.6	0.187	62.2	0.190	-46.2	1.09	10.05
2.1	0.211	-134.2	2.770	72.5	0.195	62.1	0.185	-44.4	1.10	9.62
2.2	0.209	-135.5	2.665	71.2	0.203	61.9	0.179	-42.9	1.10	9.24
2.3	0.203	-137.3	2.567	69.5	0.211	61.7	0.174	-41.7	1.11	8.87
2.4	0.199	-139.1	2.476	68.1	0.219	61.2	0.168	-40.3	1.11	8.51
2.5	0.196	-141.7	2.405	66.5	0.227	60.9	0.160	-39.2	1.11	8.22
2.6	0.192	-144.4	2.323	65.2	0.235	60.2	0.152	-38.4	1.12	7.88
2.7	0.190	-146.2	2.254	63.6	0.243	59.8	0.145	-38.6	1.12	7.58
2.8	0.184	-149.3	2.192	62.2	0.251	59.5	0.137	-38.6	1.12	7.30
2.9	0.186	-152.1	2.132	61.0	0.259	58.9	0.128	-38.4	1.12	7.05
3.0	0.184	-155.4	2.070	59.5	0.266	58.3	0.119	-39.4	1.13	6.76
4.0	0.260	177.2	1.637	46.3	0.340	52.4	0.026	2.3	1.11	4.77
5.0	0.317	170.0	1.390	35.3	0.405	45.7	0.095	78.3	1.10	3.41

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.672	-28.6	22.384	153.7	0.022	79.1	0.848	-20.9	0.28	30.12
0.2	0.586	-52.4	18.392	136.3	0.037	68.2	0.702	-36.1	0.43	26.92
0.3	0.487	-67.9	14.787	124.3	0.048	63.9	0.567	-45.7	0.57	24.86
0.4	0.426	-81.0	12.236	115.6	0.057	62.2	0.467	-52.0	0.68	23.28
0.5	0.371	-92.4	10.274	109.0	0.066	62.2	0.393	-55.7	0.77	21.92
0.6	0.329	-99.8	8.801	103.8	0.074	62.7	0.337	-58.1	0.84	20.77
0.7	0.305	-106.9	7.693	99.4	0.082	63.2	0.295	-59.7	0.89	19.73
0.8	0.280	-112.4	6.849	96.4	0.090	64.0	0.264	-60.5	0.94	18.82
0.9	0.270	-116.4	6.111	93.9	0.098	64.2	0.242	-61.1	0.97	17.94
1.0	0.259	-120.6	5.578	91.3	0.106	64.7	0.221	-61.5	0.99	17.21
1.1	0.251	-123.6	5.100	89.2	0.114	65.1	0.205	-61.3	1.02	15.76
1.2	0.241	-127.0	4.726	87.0	0.122	65.3	0.193	-60.6	1.03	14.80
1.3	0.232	-129.9	4.380	84.8	0.130	65.5	0.183	-58.9	1.05	13.94
1.4	0.224	-131.6	4.111	82.8	0.139	65.7	0.175	-57.0	1.06	13.27
1.5	0.219	-132.7	3.853	81.1	0.147	65.6	0.170	-55.0	1.07	12.62
1.6	0.214	-134.0	3.641	79.3	0.156	65.5	0.166	-52.6	1.07	12.07
1.7	0.208	-134.7	3.441	77.6	0.164	65.4	0.163	-49.7	1.08	11.51
1.8	0.202	-136.2	3.271	76.1	0.173	65.2	0.159	-47.4	1.08	11.01
1.9	0.196	-137.5	3.110	74.6	0.181	64.8	0.158	-44.6	1.09	10.52
2.0	0.191	-138.3	2.970	73.2	0.190	64.5	0.154	-41.9	1.09	10.08
2.1	0.188	-139.2	2.854	71.3	0.199	64.3	0.151	-39.5	1.09	9.70
2.2	0.186	-140.8	2.746	70.1	0.207	63.8	0.147	-37.5	1.10	9.33
2.3	0.184	-143.4	2.639	68.4	0.216	63.5	0.144	-35.8	1.10	8.97
2.4	0.178	-144.8	2.540	67.0	0.224	62.9	0.139	-33.8	1.10	8.59
2.5	0.177	-146.8	2.464	65.5	0.232	62.5	0.132	-32.3	1.10	8.30
2.6	0.178	-149.7	2.377	64.2	0.241	61.6	0.126	-30.7	1.10	7.97
2.7	0.172	-150.4	2.308	62.6	0.249	61.1	0.119	-30.6	1.11	7.67
2.8	0.171	-154.0	2.242	61.3	0.258	60.5	0.112	-30.3	1.11	7.40
2.9	0.173	-157.3	2.181	60.0	0.266	60.0	0.103	-29.1	1.11	7.15
3.0	0.171	-159.6	2.115	58.8	0.273	59.3	0.096	-29.4	1.11	6.86
4.0	0.257	174.6	1.665	46.1	0.347	52.6	0.036	53.0	1.10	4.87
5.0	0.318	168.9	1.407	35.3	0.412	45.4	0.122	79.0	1.09	3.49

$V_{CE} = 1\text{ V}$, $I_C = 20\text{ mA}$, $Z_0 = 50\ \Omega$

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	0.512	-40.5	29.527	145.7	0.020	74.9	0.733	-28.6	0.46	31.68
0.2	0.412	-71.9	21.980	126.0	0.031	67.6	0.546	-45.7	0.62	28.49
0.3	0.331	-90.6	16.556	115.0	0.041	66.9	0.412	-54.5	0.77	26.01
0.4	0.296	-103.8	13.167	107.6	0.050	67.8	0.325	-59.5	0.86	24.19
0.5	0.269	-115.9	10.796	102.0	0.059	68.4	0.267	-62.2	0.92	22.60
0.6	0.247	-123.4	9.143	97.8	0.068	69.1	0.224	-63.8	0.97	21.28
0.7	0.235	-129.6	7.913	94.2	0.077	69.8	0.193	-64.6	1.00	19.71
0.8	0.224	-133.7	6.998	91.7	0.087	70.1	0.171	-64.8	1.03	18.10
0.9	0.224	-137.2	6.247	89.7	0.096	70.1	0.156	-64.8	1.04	16.94
1.0	0.220	-140.6	5.665	87.5	0.105	70.3	0.141	-65.0	1.05	15.94
1.1	0.216	-142.5	5.185	85.5	0.114	70.4	0.129	-64.2	1.06	15.07
1.2	0.212	-145.2	4.789	83.6	0.123	70.2	0.121	-62.4	1.07	14.31
1.3	0.207	-147.6	4.430	81.4	0.132	70.1	0.115	-59.1	1.08	13.57
1.4	0.200	-149.1	4.145	79.8	0.141	70.0	0.110	-55.8	1.08	12.94
1.5	0.197	-149.9	3.889	78.3	0.150	69.6	0.108	-52.0	1.08	12.36
1.6	0.193	-150.5	3.670	76.6	0.160	69.2	0.107	-48.1	1.09	11.84
1.7	0.189	-150.8	3.467	75.2	0.169	68.9	0.107	-43.5	1.09	11.31
1.8	0.184	-151.6	3.292	73.7	0.178	68.4	0.106	-39.6	1.09	10.83
1.9	0.179	-152.4	3.128	72.2	0.187	67.7	0.108	-35.6	1.09	10.37
2.0	0.178	-153.2	2.991	70.9	0.197	67.2	0.107	-31.7	1.09	9.97
2.1	0.175	-153.8	2.867	69.1	0.206	66.7	0.107	-28.3	1.09	9.58
2.2	0.176	-154.8	2.752	68.1	0.215	66.1	0.105	-25.3	1.09	9.21
2.3	0.173	-156.5	2.647	66.4	0.224	65.5	0.104	-22.7	1.09	8.86
2.4	0.172	-157.5	2.542	65.1	0.232	64.7	0.101	-19.8	1.10	8.48
2.5	0.170	-159.8	2.469	63.6	0.241	64.1	0.097	-16.9	1.10	8.21
2.6	0.172	-162.4	2.380	62.4	0.250	63.1	0.093	-13.9	1.10	7.89
2.7	0.172	-162.7	2.306	60.9	0.259	62.4	0.087	-12.7	1.10	7.59
2.8	0.169	-166.6	2.239	59.5	0.267	61.8	0.081	-10.4	1.10	7.32
2.9	0.173	-168.4	2.176	58.4	0.276	61.0	0.075	-7.4	1.10	7.06
3.0	0.174	-171.6	2.114	57.0	0.284	60.3	0.068	-5.9	1.10	6.80
4.0	0.273	169.4	1.651	44.9	0.358	52.6	0.069	79.5	1.09	4.80
5.0	0.330	164.5	1.392	34.5	0.423	44.8	0.159	81.2	1.08	3.42

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.964	-6.4	3.306	171.7	0.022	83.3	0.992	-4.0	0.12	21.73
0.2	0.958	-14.6	3.228	165.1	0.042	80.6	0.981	-7.9	0.11	18.89
0.3	0.938	-21.4	3.107	159.5	0.061	75.6	0.960	-11.6	0.15	17.06
0.4	0.927	-28.2	3.051	153.5	0.079	71.3	0.939	-15.5	0.18	15.85
0.5	0.896	-35.1	2.965	147.0	0.096	66.8	0.915	-19.1	0.23	14.91
0.6	0.866	-40.9	2.840	141.0	0.110	63.1	0.887	-22.3	0.28	14.10
0.7	0.839	-46.7	2.740	135.5	0.123	59.7	0.859	-25.3	0.32	13.48
0.8	0.804	-51.9	2.626	130.7	0.134	56.7	0.827	-28.1	0.37	12.93
0.9	0.771	-57.0	2.495	126.2	0.143	54.0	0.804	-30.5	0.40	12.41
1.0	0.745	-61.6	2.382	121.9	0.151	51.7	0.777	-32.8	0.45	11.99
1.1	0.722	-65.9	2.279	118.1	0.158	49.7	0.755	-34.7	0.48	11.60
1.2	0.697	-70.1	2.203	114.2	0.163	47.8	0.735	-36.6	0.52	11.32
1.3	0.674	-73.8	2.108	110.4	0.168	46.3	0.718	-38.0	0.56	10.99
1.4	0.653	-77.3	2.031	107.2	0.172	45.0	0.702	-39.3	0.60	10.73
1.5	0.634	-80.4	1.949	104.4	0.175	43.9	0.687	-40.5	0.64	10.46
1.6	0.614	-83.6	1.883	101.3	0.179	43.1	0.674	-41.5	0.68	10.23
1.7	0.596	-86.2	1.804	98.6	0.181	42.2	0.663	-42.2	0.72	9.97
1.8	0.578	-89.0	1.785	96.3	0.184	41.8	0.646	-43.4	0.75	9.86
1.9	0.560	-91.6	1.704	93.8	0.187	41.1	0.640	-43.8	0.79	9.60
2.0	0.545	-94.2	1.656	91.3	0.190	41.0	0.626	-44.3	0.83	9.41
2.1	0.528	-96.5	1.619	88.6	0.192	41.0	0.614	-44.9	0.87	9.25
2.2	0.512	-99.2	1.588	86.6	0.194	41.1	0.601	-45.6	0.91	9.14
2.3	0.495	-101.8	1.555	84.0	0.195	41.3	0.589	-46.3	0.95	9.01
2.4	0.480	-104.0	1.514	82.2	0.197	41.2	0.578	-46.8	0.99	8.87
2.5	0.464	-106.5	1.499	79.9	0.199	41.5	0.562	-47.6	1.02	7.82
2.6	0.447	-109.7	1.464	78.1	0.200	41.2	0.551	-48.9	1.06	7.11
2.7	0.433	-112.0	1.447	75.7	0.202	41.6	0.540	-50.1	1.09	6.70
2.8	0.420	-115.2	1.422	73.7	0.203	42.0	0.529	-51.1	1.12	6.31
2.9	0.410	-118.2	1.401	72.0	0.205	42.3	0.516	-51.7	1.16	5.96
3.0	0.396	-121.2	1.373	70.3	0.205	42.6	0.501	-53.7	1.20	5.54
4.0	0.359	-156.2	1.178	51.4	0.241	49.7	0.388	-68.7	1.33	3.45
5.0	0.379	-173.5	1.034	37.8	0.302	53.9	0.280	-92.9	1.31	1.98

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.904	-13.0	9.467	166.3	0.022	84.3	0.964	-7.9	0.11	26.26
0.2	0.873	-23.9	8.906	156.9	0.039	75.7	0.925	-15.4	0.20	23.55
0.3	0.818	-34.4	8.232	147.7	0.055	70.1	0.863	-21.8	0.27	21.74
0.4	0.768	-44.1	7.669	139.5	0.069	65.2	0.804	-27.6	0.33	20.47
0.5	0.707	-53.0	7.045	131.7	0.080	61.4	0.744	-32.1	0.40	19.46
0.6	0.649	-60.0	6.428	125.0	0.089	58.8	0.688	-35.7	0.48	18.59
0.7	0.601	-66.4	5.906	119.3	0.097	56.8	0.637	-38.5	0.55	17.87
0.8	0.554	-71.6	5.427	114.6	0.103	55.5	0.594	-40.6	0.61	17.21
0.9	0.520	-76.7	4.972	110.6	0.109	54.8	0.559	-42.3	0.66	16.58
1.0	0.490	-80.9	4.603	107.0	0.114	54.1	0.528	-43.8	0.71	16.05
1.1	0.467	-84.7	4.289	103.8	0.120	53.8	0.501	-44.9	0.76	15.54
1.2	0.443	-88.6	4.044	100.8	0.124	53.7	0.480	-45.6	0.80	15.12
1.3	0.418	-91.9	3.787	97.5	0.129	53.8	0.463	-45.9	0.84	14.66
1.4	0.399	-94.3	3.578	95.0	0.134	54.0	0.447	-46.2	0.88	14.26
1.5	0.385	-96.5	3.379	92.7	0.139	54.3	0.435	-46.1	0.91	13.85
1.6	0.371	-98.8	3.215	90.3	0.144	54.5	0.425	-46.1	0.94	13.48
1.7	0.358	-100.7	3.052	88.2	0.149	54.8	0.417	-45.6	0.97	13.11
1.8	0.342	-102.5	2.928	86.3	0.155	55.2	0.405	-45.5	0.99	12.77
1.9	0.332	-104.5	2.787	84.4	0.160	55.3	0.399	-44.9	1.02	11.58
2.0	0.318	-106.3	2.674	82.5	0.166	55.7	0.390	-44.3	1.04	10.85
2.1	0.308	-107.6	2.585	80.3	0.172	56.2	0.382	-43.8	1.06	10.33
2.2	0.298	-109.4	2.497	78.8	0.177	56.6	0.373	-43.7	1.07	9.85
2.3	0.287	-111.4	2.417	76.8	0.183	57.1	0.365	-43.5	1.09	9.41
2.4	0.277	-112.7	2.332	75.3	0.188	57.0	0.357	-43.2	1.11	8.95
2.5	0.267	-114.9	2.275	73.5	0.194	57.3	0.346	-43.2	1.12	8.61
2.6	0.259	-117.5	2.202	72.0	0.200	57.0	0.336	-43.4	1.13	8.23
2.7	0.251	-119.2	2.148	70.2	0.206	57.3	0.328	-44.1	1.14	7.94
2.8	0.238	-122.2	2.098	68.6	0.212	57.4	0.319	-44.7	1.15	7.64
2.9	0.233	-124.5	2.044	67.3	0.218	57.2	0.308	-44.8	1.15	7.34
3.0	0.226	-127.8	1.990	65.8	0.224	57.2	0.298	-46.2	1.16	7.04
4.0	0.245	-163.4	1.610	50.9	0.292	55.7	0.191	-54.4	1.16	4.99
5.0	0.294	-175.3	1.380	38.8	0.357	51.4	0.093	-55.4	1.14	3.57

$V_{CE} = 2\text{ V}$, $I_C = 5\text{ mA}$, $Z_0 = 50\ \Omega$

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	0.842	-15.7	14.348	162.5	0.020	79.6	0.935	-11.3	0.22	28.66
0.2	0.791	-30.9	13.053	150.2	0.037	73.1	0.866	-21.0	0.28	25.48
0.3	0.709	-43.2	11.564	139.5	0.050	67.4	0.777	-28.6	0.38	23.65
0.4	0.637	-54.3	10.348	130.4	0.061	63.4	0.693	-34.6	0.46	22.30
0.5	0.573	-63.5	9.151	122.6	0.070	61.2	0.620	-38.6	0.55	21.18
0.6	0.509	-70.4	8.103	116.2	0.077	59.6	0.560	-41.6	0.63	20.20
0.7	0.463	-76.1	7.269	111.0	0.084	59.3	0.508	-43.5	0.70	19.36
0.8	0.423	-81.4	6.569	106.9	0.091	58.9	0.467	-44.8	0.76	18.60
0.9	0.394	-85.7	5.927	103.5	0.097	59.1	0.437	-45.8	0.81	17.86
1.0	0.372	-89.5	5.445	100.5	0.103	59.1	0.410	-46.6	0.85	17.24
1.1	0.354	-93.3	5.038	97.7	0.109	59.4	0.387	-47.0	0.89	16.66
1.2	0.334	-96.4	4.693	94.9	0.115	59.7	0.371	-46.9	0.92	16.12
1.3	0.314	-99.0	4.376	92.2	0.121	60.2	0.358	-46.5	0.96	15.59
1.4	0.299	-100.8	4.100	90.0	0.127	60.5	0.346	-46.0	0.98	15.10
1.5	0.287	-102.6	3.865	88.0	0.133	60.8	0.338	-45.4	1.00	14.26
1.6	0.276	-104.4	3.659	85.9	0.140	61.2	0.332	-44.6	1.02	13.34
1.7	0.267	-105.3	3.465	84.2	0.146	61.3	0.327	-43.6	1.04	12.58
1.8	0.256	-107.1	3.302	82.4	0.153	61.6	0.319	-42.8	1.05	11.97
1.9	0.249	-108.3	3.145	80.7	0.160	61.6	0.316	-41.7	1.06	11.43
2.0	0.239	-109.2	3.006	79.2	0.167	61.8	0.310	-40.7	1.07	10.89
2.1	0.232	-110.4	2.893	77.1	0.174	61.9	0.305	-39.7	1.08	10.47
2.2	0.227	-111.7	2.782	75.8	0.180	62.1	0.299	-39.1	1.09	10.05
2.3	0.218	-113.3	2.684	74.1	0.187	62.2	0.294	-38.5	1.10	9.67
2.4	0.213	-114.5	2.586	72.7	0.194	62.0	0.288	-38.0	1.11	9.27
2.5	0.204	-116.3	2.516	71.1	0.201	61.9	0.279	-37.6	1.11	8.96
2.6	0.198	-118.8	2.435	69.8	0.209	61.4	0.271	-37.4	1.11	8.62
2.7	0.193	-119.6	2.368	68.2	0.215	61.3	0.264	-38.0	1.12	8.32
2.8	0.185	-123.0	2.302	66.8	0.222	61.1	0.257	-38.4	1.12	8.03
2.9	0.181	-125.1	2.238	65.6	0.229	60.8	0.247	-38.3	1.13	7.73
3.0	0.176	-128.5	2.173	64.2	0.235	60.4	0.238	-39.4	1.13	7.43
4.0	0.214	-165.8	1.736	50.8	0.308	56.6	0.137	-42.3	1.12	5.39
5.0	0.273	-176.1	1.479	39.3	0.373	50.7	0.067	-11.5	1.11	3.98

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.797	-19.7	18.292	159.5	0.020	79.9	0.908	-13.8	0.23	29.59
0.2	0.720	-36.8	16.115	145.2	0.034	72.5	0.812	-25.1	0.33	26.75
0.3	0.619	-49.8	13.793	133.7	0.046	66.8	0.704	-33.1	0.46	24.76
0.4	0.546	-61.1	11.942	124.4	0.056	63.6	0.611	-38.7	0.56	23.30
0.5	0.478	-69.9	10.305	117.0	0.064	62.2	0.537	-42.2	0.65	22.10
0.6	0.422	-77.3	9.004	111.1	0.071	62.0	0.477	-44.3	0.73	21.03
0.7	0.380	-82.5	7.966	106.2	0.078	62.1	0.429	-45.6	0.80	20.10
0.8	0.345	-87.3	7.143	102.6	0.085	62.4	0.394	-46.3	0.85	19.26
0.9	0.323	-90.9	6.406	99.7	0.092	62.7	0.368	-46.6	0.89	18.44
1.0	0.303	-94.8	5.855	96.9	0.098	62.9	0.345	-47.2	0.93	17.75
1.1	0.289	-98.0	5.401	94.4	0.105	63.4	0.325	-47.1	0.96	17.12
1.2	0.273	-101.1	5.015	91.9	0.112	63.7	0.312	-46.5	0.98	16.53
1.3	0.258	-103.1	4.662	89.4	0.119	64.0	0.302	-45.6	1.00	15.66
1.4	0.245	-104.9	4.366	87.5	0.125	64.5	0.294	-44.6	1.02	14.55
1.5	0.236	-106.6	4.093	85.7	0.132	64.5	0.288	-43.6	1.04	13.75
1.6	0.230	-107.6	3.875	83.7	0.140	64.7	0.284	-42.5	1.04	13.15
1.7	0.223	-108.0	3.659	82.1	0.147	64.7	0.281	-41.1	1.06	12.52
1.8	0.213	-108.3	3.480	80.5	0.154	64.9	0.276	-40.0	1.07	11.96
1.9	0.208	-110.1	3.313	78.9	0.162	64.7	0.275	-38.6	1.07	11.48
2.0	0.200	-110.5	3.163	77.4	0.169	64.7	0.271	-37.2	1.08	10.99
2.1	0.196	-111.4	3.036	75.5	0.177	64.7	0.268	-36.2	1.08	10.58
2.2	0.190	-112.4	2.922	74.3	0.184	64.6	0.263	-35.4	1.09	10.19
2.3	0.183	-114.0	2.812	72.7	0.191	64.5	0.260	-34.6	1.09	9.81
2.4	0.183	-115.0	2.712	71.4	0.198	64.2	0.255	-33.8	1.10	9.46
2.5	0.172	-116.6	2.631	69.8	0.206	63.9	0.248	-33.3	1.10	9.13
2.6	0.169	-119.7	2.543	68.7	0.214	63.4	0.241	-32.9	1.10	8.80
2.7	0.166	-120.4	2.469	67.1	0.220	63.1	0.234	-33.3	1.11	8.50
2.8	0.158	-123.2	2.400	65.8	0.228	62.7	0.228	-33.7	1.11	8.22
2.9	0.156	-126.0	2.333	64.7	0.235	62.3	0.220	-33.5	1.11	7.94
3.0	0.152	-128.8	2.264	63.4	0.242	61.8	0.211	-34.5	1.11	7.64
4.0	0.201	-166.8	1.796	50.7	0.316	56.9	0.114	-32.6	1.10	5.58
5.0	0.264	-176.7	1.524	39.5	0.381	50.3	0.072	13.8	1.09	4.16

$V_{CE} = 2\text{ V}$, $I_C = 10\text{ mA}$, $Z_0 = 50\ \Omega$

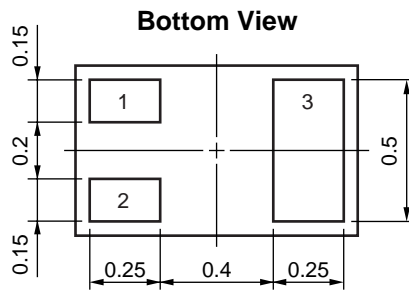
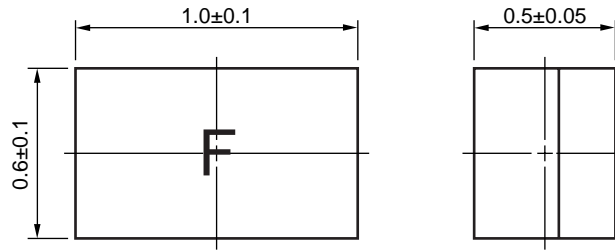
Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.716	-23.9	22.849	156.0	0.019	80.0	0.871	-16.7	0.28	30.72
0.2	0.630	-43.2	19.237	139.5	0.031	71.1	0.747	-29.4	0.41	27.89
0.3	0.522	-56.8	15.798	127.6	0.042	66.9	0.625	-37.3	0.56	25.73
0.4	0.450	-68.1	13.287	118.9	0.051	65.0	0.529	-42.1	0.67	24.18
0.5	0.391	-77.1	11.241	112.1	0.059	64.6	0.458	-44.7	0.75	22.83
0.6	0.340	-83.8	9.703	106.7	0.066	64.9	0.403	-46.0	0.83	21.67
0.7	0.306	-89.2	8.507	102.1	0.073	65.4	0.361	-46.6	0.88	20.64
0.8	0.278	-93.3	7.569	98.9	0.081	65.9	0.331	-46.6	0.92	19.71
0.9	0.263	-96.8	6.768	96.4	0.089	66.2	0.310	-46.4	0.95	18.83
1.0	0.250	-100.5	6.157	94.0	0.096	66.5	0.291	-46.6	0.98	18.09
1.1	0.238	-103.1	5.667	91.8	0.103	66.9	0.275	-46.1	1.00	17.41
1.2	0.224	-106.0	5.275	89.5	0.110	67.1	0.264	-45.0	1.02	16.05
1.3	0.214	-108.3	4.864	86.9	0.118	67.4	0.257	-43.6	1.03	15.07
1.4	0.203	-109.2	4.554	85.3	0.125	67.6	0.252	-42.3	1.04	14.33
1.5	0.196	-110.2	4.274	83.7	0.133	67.7	0.248	-40.9	1.05	13.67
1.6	0.192	-111.3	4.033	81.8	0.140	67.6	0.247	-39.5	1.06	13.11
1.7	0.187	-111.3	3.806	80.3	0.148	67.5	0.246	-37.9	1.07	12.54
1.8	0.179	-111.1	3.625	78.7	0.156	67.3	0.243	-36.5	1.07	12.04
1.9	0.175	-111.4	3.443	77.4	0.164	67.1	0.244	-35.0	1.07	11.55
2.0	0.172	-112.8	3.281	75.9	0.172	66.9	0.242	-33.4	1.08	11.10
2.1	0.165	-112.8	3.152	74.1	0.180	66.7	0.241	-32.2	1.08	10.70
2.2	0.164	-113.8	3.024	73.0	0.187	66.4	0.237	-31.3	1.08	10.31
2.3	0.158	-114.7	2.909	71.5	0.195	66.2	0.235	-30.4	1.09	9.93
2.4	0.153	-115.6	2.801	70.2	0.202	65.7	0.231	-29.4	1.09	9.56
2.5	0.149	-118.0	2.716	68.8	0.210	65.4	0.225	-28.9	1.09	9.27
2.6	0.149	-119.9	2.616	67.7	0.218	64.7	0.219	-28.2	1.09	8.91
2.7	0.144	-120.2	2.544	66.3	0.226	64.4	0.213	-28.6	1.10	8.63
2.8	0.137	-124.4	2.473	65.0	0.233	63.9	0.207	-28.9	1.10	8.36
2.9	0.137	-127.4	2.399	64.0	0.241	63.3	0.199	-28.6	1.10	8.07
3.0	0.132	-129.5	2.327	62.6	0.248	62.8	0.191	-29.5	1.10	7.77
4.0	0.192	-168.6	1.836	50.5	0.322	57.1	0.099	-22.1	1.09	5.70
5.0	0.259	-177.7	1.555	39.6	0.388	50.1	0.084	30.1	1.08	4.29

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

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	0.555	-33.0	31.233	148.4	0.015	76.5	0.784	-22.7	0.44	33.09
0.2	0.444	-56.7	23.972	129.5	0.027	71.1	0.614	-35.9	0.60	29.43
0.3	0.348	-71.1	18.373	118.0	0.036	69.8	0.485	-42.1	0.75	27.07
0.4	0.300	-82.4	14.778	110.4	0.044	69.7	0.400	-44.9	0.84	25.21
0.5	0.257	-92.8	12.217	104.7	0.053	70.2	0.342	-45.5	0.90	23.65
0.6	0.227	-98.9	10.385	100.1	0.061	71.0	0.300	-45.1	0.95	22.33
0.7	0.207	-103.2	8.985	96.5	0.069	71.5	0.270	-44.3	0.99	21.15
0.8	0.187	-108.5	7.968	93.9	0.077	71.8	0.250	-43.3	1.01	19.58
0.9	0.183	-110.6	7.075	91.9	0.085	71.8	0.238	-42.4	1.02	18.22
1.0	0.178	-114.4	6.424	89.8	0.093	71.9	0.224	-42.2	1.04	17.20
1.1	0.173	-117.2	5.901	87.9	0.101	72.0	0.213	-41.0	1.05	16.33
1.2	0.164	-119.9	5.439	86.0	0.109	72.0	0.207	-39.3	1.06	15.53
1.3	0.158	-121.7	5.051	83.7	0.118	72.0	0.206	-37.4	1.06	14.83
1.4	0.150	-122.2	4.713	82.2	0.126	71.9	0.204	-35.7	1.07	14.17
1.5	0.147	-122.5	4.410	80.7	0.134	71.6	0.204	-34.2	1.07	13.56
1.6	0.146	-120.9	4.156	79.1	0.142	71.2	0.206	-32.7	1.07	13.03
1.7	0.142	-121.1	3.926	77.7	0.151	70.9	0.208	-30.8	1.07	12.51
1.8	0.136	-120.5	3.722	76.3	0.159	70.6	0.209	-29.3	1.08	12.01
1.9	0.135	-120.9	3.537	75.0	0.167	70.0	0.212	-27.9	1.08	11.56
2.0	0.131	-121.5	3.371	73.8	0.176	69.6	0.212	-26.3	1.08	11.12
2.1	0.130	-120.3	3.230	72.1	0.184	69.2	0.213	-24.9	1.08	10.73
2.2	0.127	-121.2	3.101	71.1	0.192	68.8	0.211	-24.1	1.08	10.35
2.3	0.127	-122.3	2.979	69.5	0.200	68.4	0.211	-23.2	1.08	9.99
2.4	0.122	-123.3	2.864	68.4	0.208	67.7	0.208	-22.2	1.08	9.62
2.5	0.122	-125.5	2.772	67.1	0.216	67.3	0.204	-21.7	1.08	9.33
2.6	0.122	-128.5	2.674	66.0	0.224	66.3	0.199	-20.8	1.08	9.00
2.7	0.119	-128.1	2.592	64.7	0.231	65.9	0.193	-21.2	1.09	8.69
2.8	0.117	-133.2	2.517	63.5	0.240	65.3	0.188	-21.4	1.09	8.43
2.9	0.117	-134.2	2.443	62.4	0.247	64.6	0.180	-20.9	1.09	8.14
3.0	0.116	-139.0	2.370	61.3	0.255	64.0	0.173	-21.7	1.09	7.87
4.0	0.191	-174.2	1.861	49.7	0.330	57.4	0.089	-6.4	1.08	5.79
5.0	0.262	178.8	1.569	39.1	0.396	50.0	0.103	41.5	1.07	4.36

PACKAGE DIMENSIONS

3-PIN NON-LEAD MINIMOLD (UNIT: mm)



PIN CONNECTIONS

- 1. Emitter
- 2. Base
- 3. Collector

[MEMO]

[MEMO]

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