

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA873TD

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)

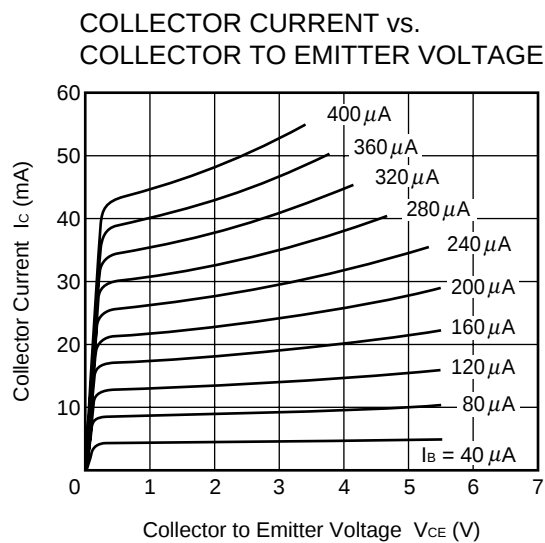
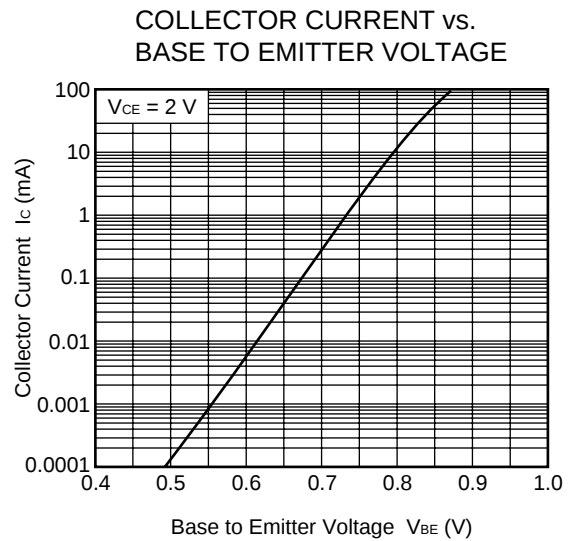
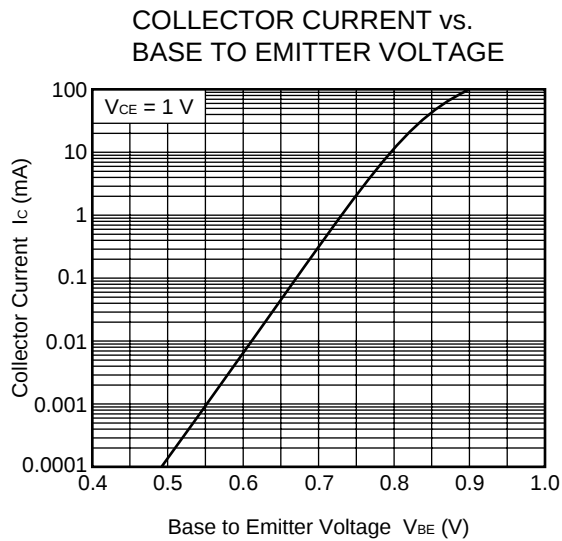
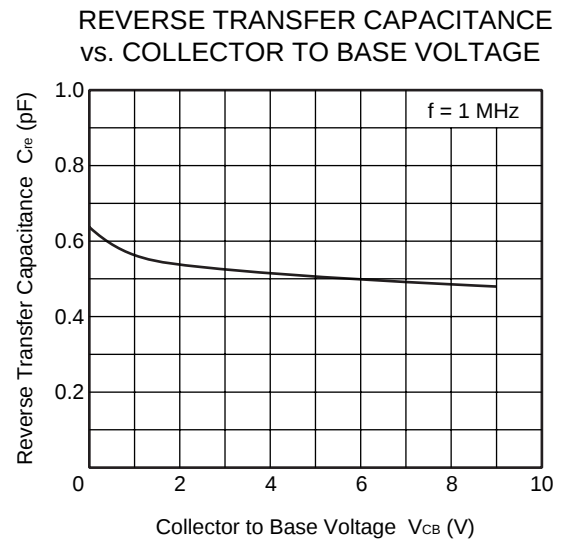
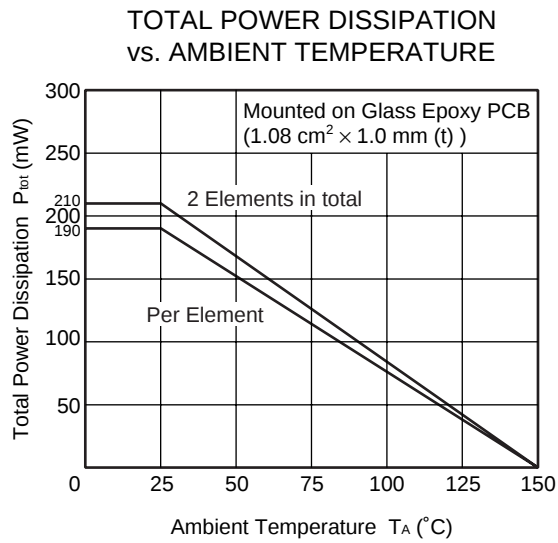
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	–	–	600	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 mA	–	–	600	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 5 mA	100	120	145	–
Gain Bandwidth Product (1)	f _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

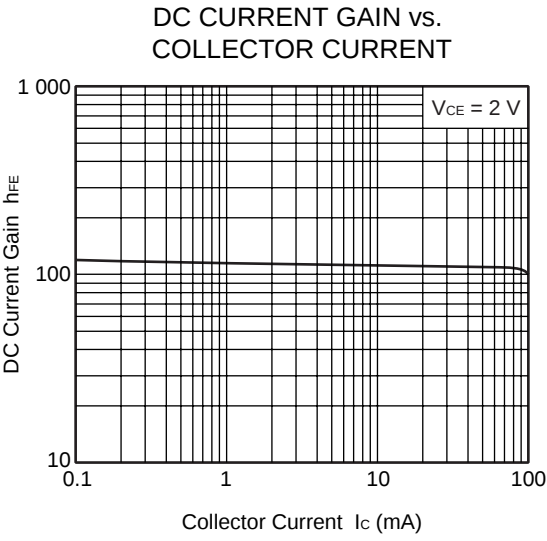
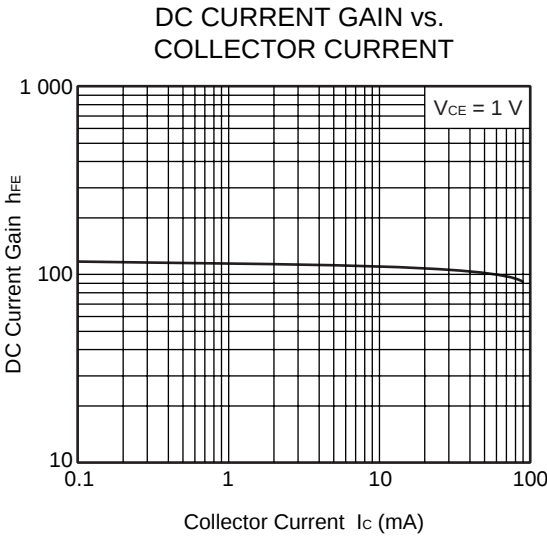
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

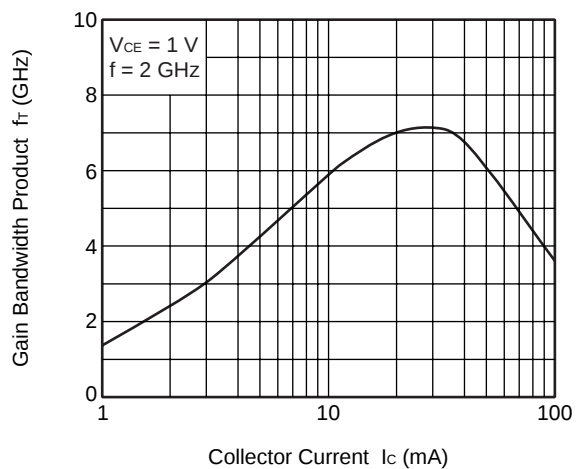
Rank	FB
Marking	cP
h _{FE} Value	100 to 145

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

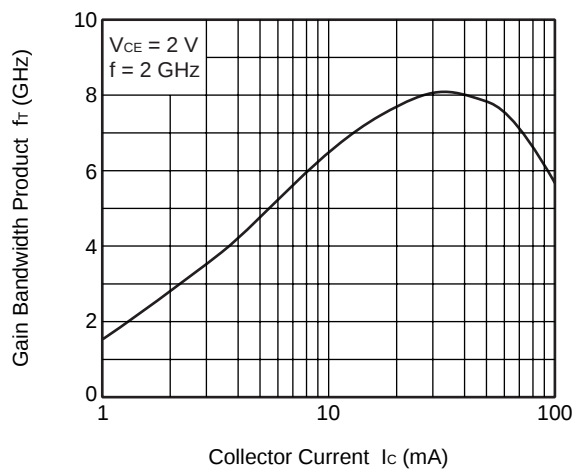




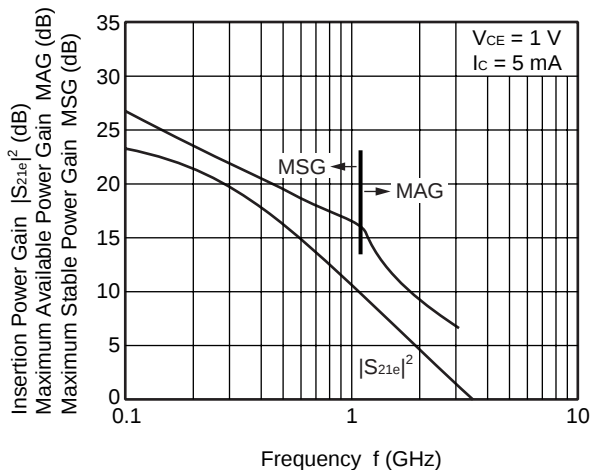
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



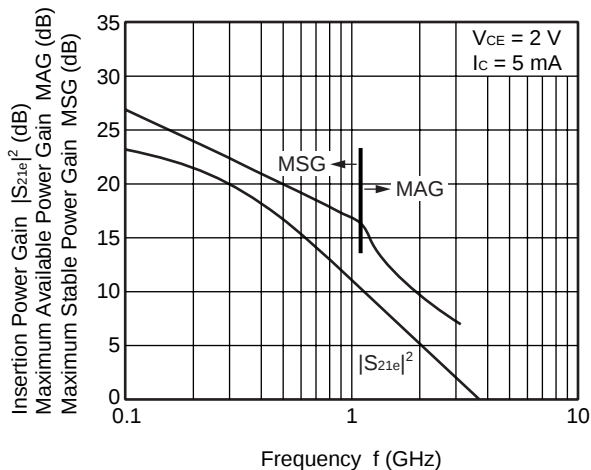
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



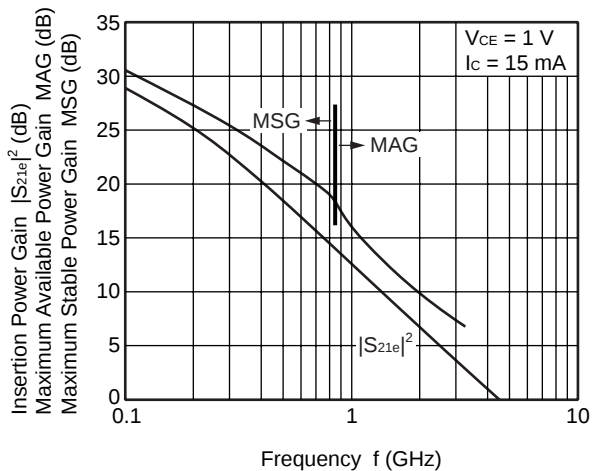
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



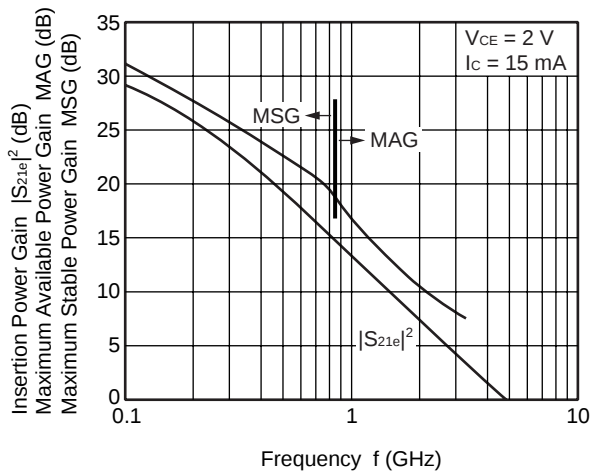
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



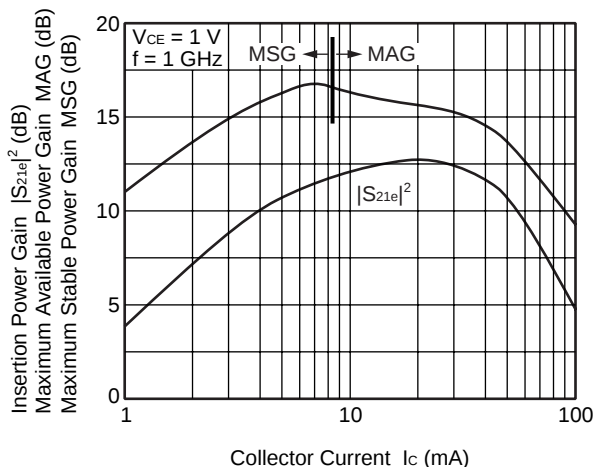
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



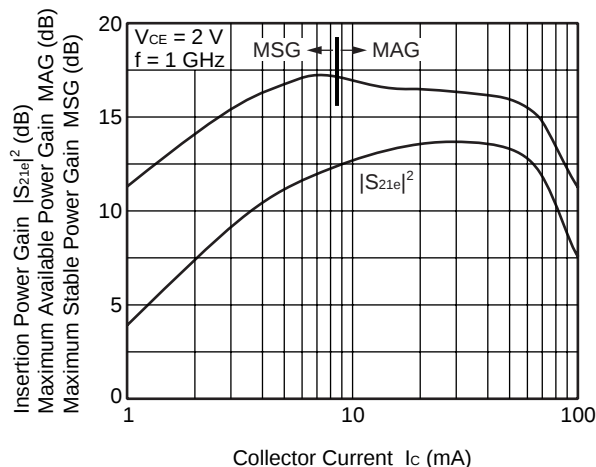
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



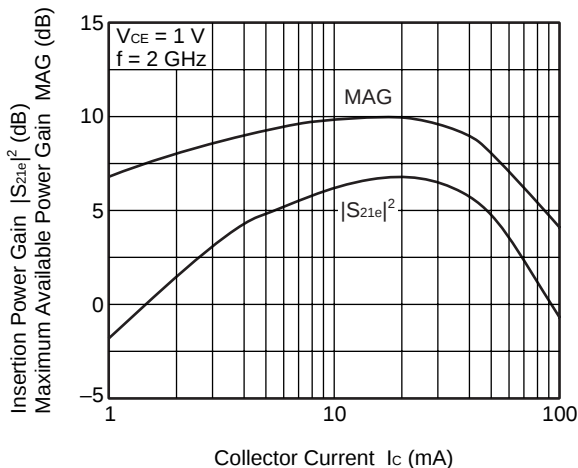
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



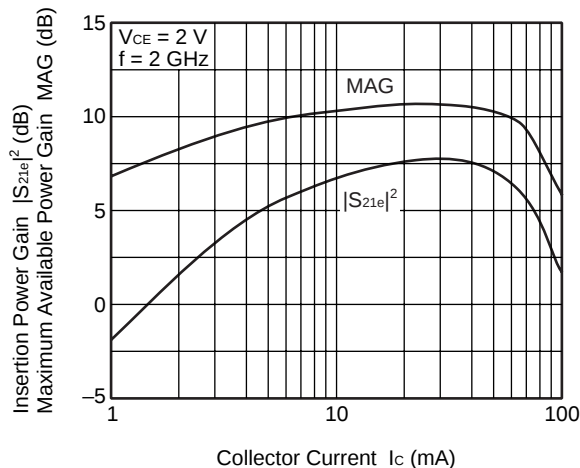
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



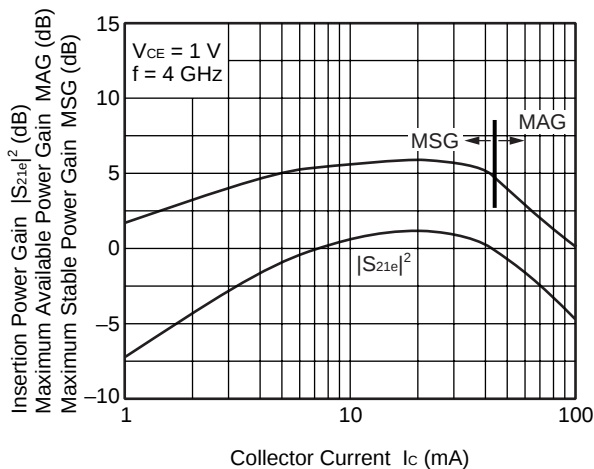
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



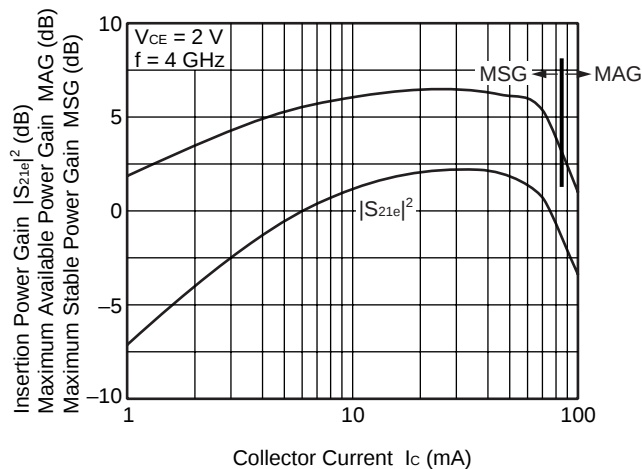
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



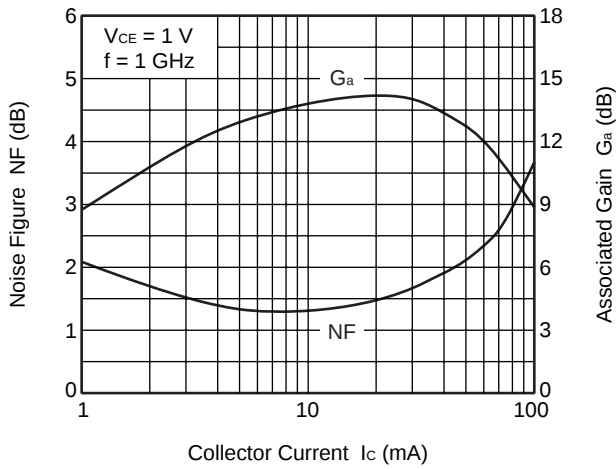
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



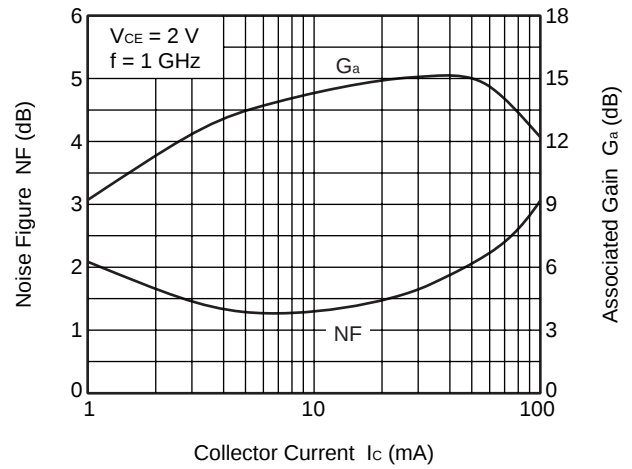
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



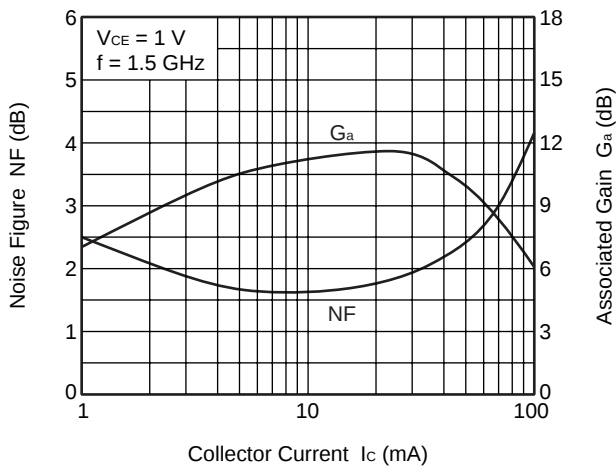
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



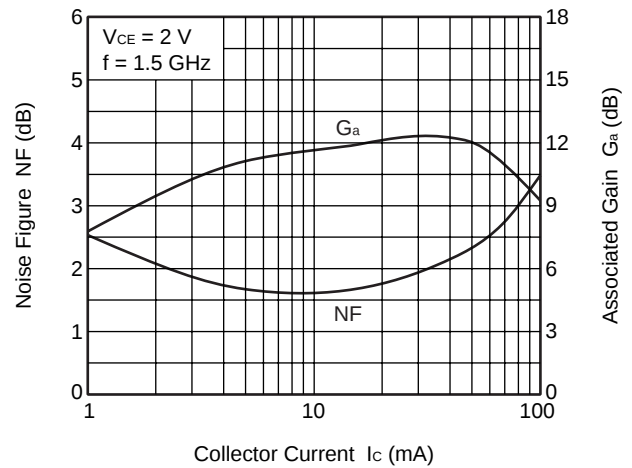
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



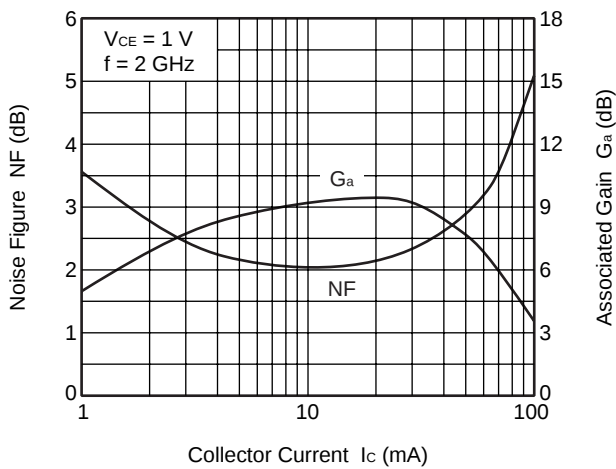
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



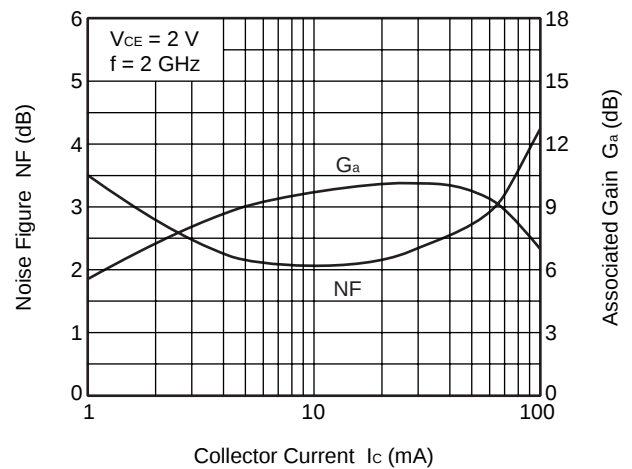
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



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