

DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR μ PA891TC

NPN SILICON RF TRANSISTOR (WITH 2 ELEMENTS) IN A FLAT-LEAD 6-PIN THIN-TYPE ULTRA SUMER 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 ($2 \times 2SC5600$)
- Flat-lead 6-pin thin-type ultra super minimold package

BUILT-IN TRANSISTORS

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

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA891TC	50 pcs (Non reel)	8 mm wide embossed taping - Pin 6 (Q1 Base), Pin 5 (Q2 Emitter), Pin 4 (Q2 Base) face the perforation side of the tape
μ PA891TC-T1	3 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}	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	200 in 1 element 230 in 2 elements	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

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

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

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$)

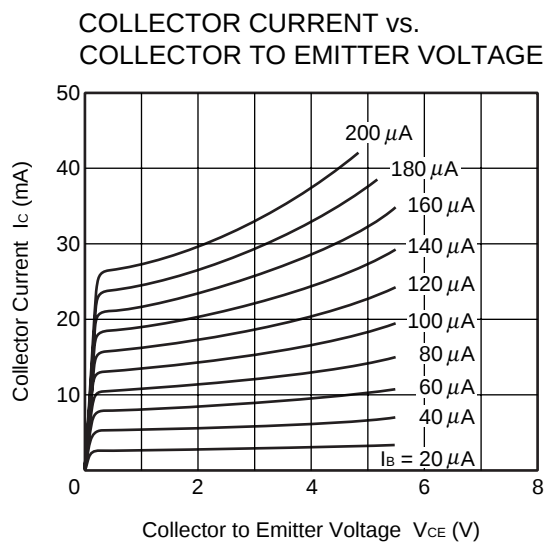
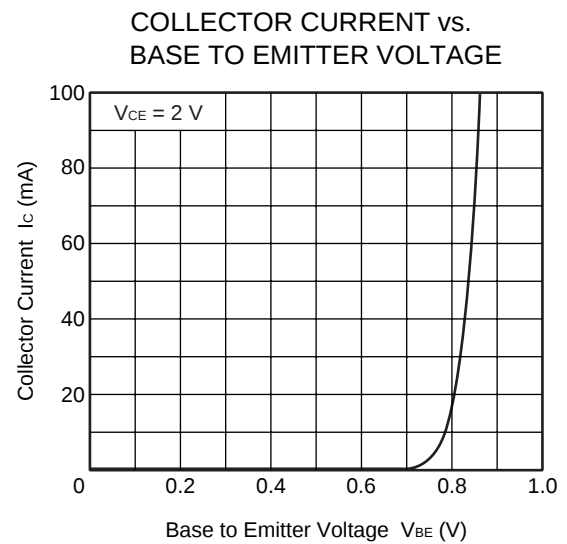
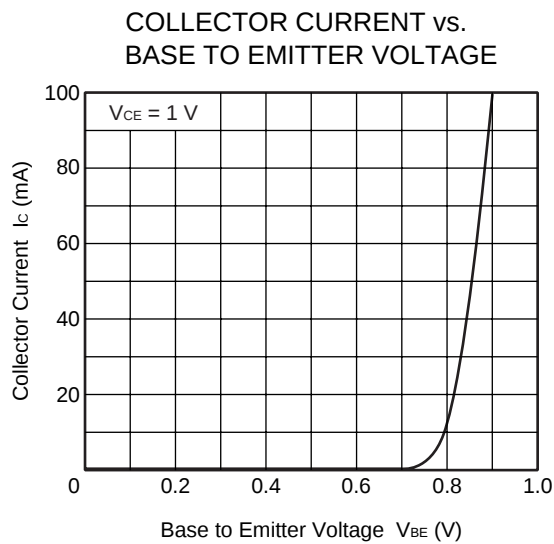
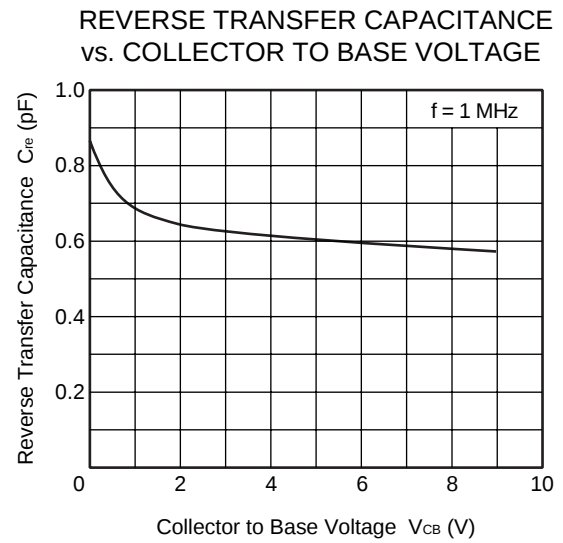
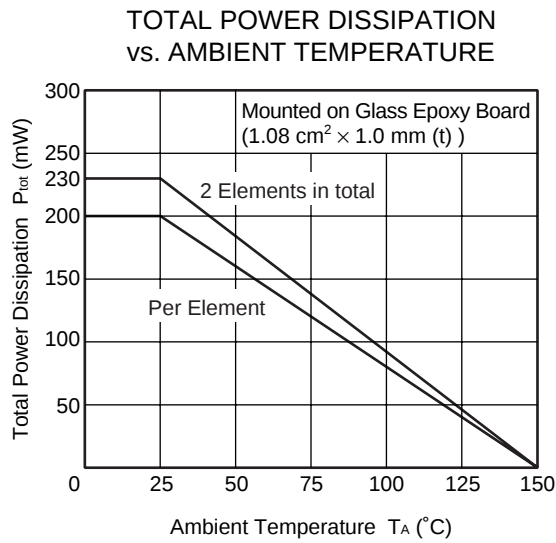
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I_{CBO}	$V_{CB} = 5\text{ V}, I_E = 0\text{ mA}$	–	–	600	nA
Emitter Cut-off Current	I_{EBO}	$V_{BE} = 1\text{ V}, I_C = 0\text{ mA}$	–	–	600	nA
DC Current Gain	h_{FE} ^{Note 1}	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$	100	–	160	–
Gain Bandwidth Product (1)	f_T	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$	3.5	5.0	–	GHz
Gain Bandwidth Product (2)	f_T	$V_{CE} = 1\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$	5.5	6.5	–	GHz
Insertion Power Gain (1)	$ S_{21e} ^2$	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$	3.5	4.0	–	dB
Insertion Power Gain (2)	$ S_{21e} ^2$	$V_{CE} = 1\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$	4.5	5.5	–	dB
Noise Figure	NF	$V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}, Z_S = Z_{opt}$	–	1.5	2.5	dB
Reverse Transfer Capacitance	C_{re} ^{Note 2}	$V_{CB} = 0.5\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	–	0.8	1.0	pF

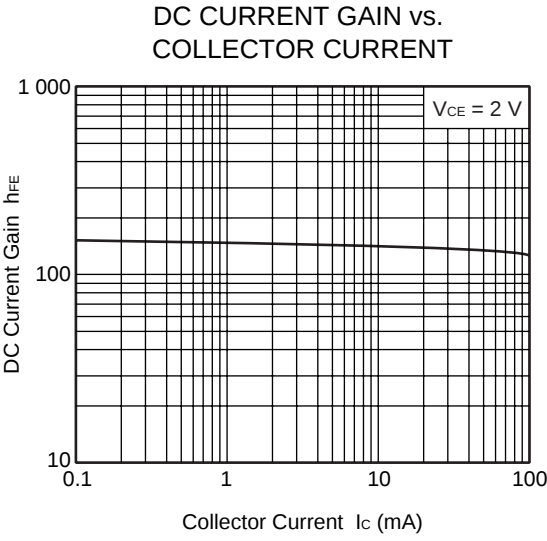
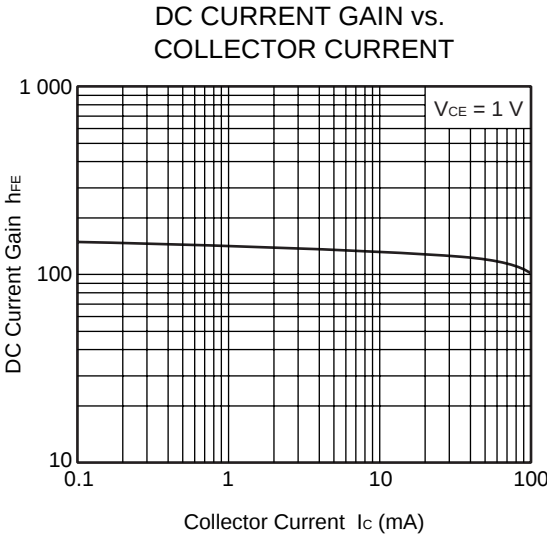
- Notes** **1.** Pulse measurement: $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

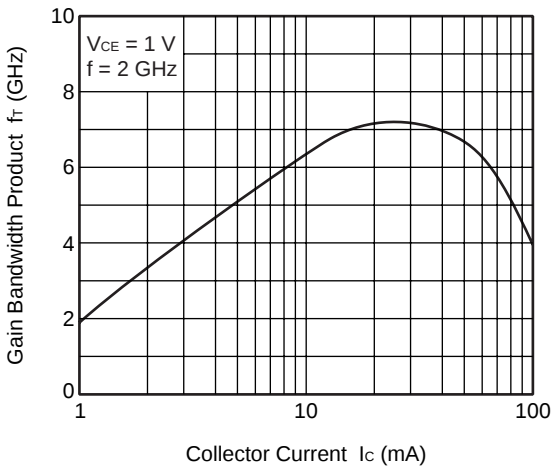
Rank	FB
Marking	4B
h_{FE} Value	100 to 160

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

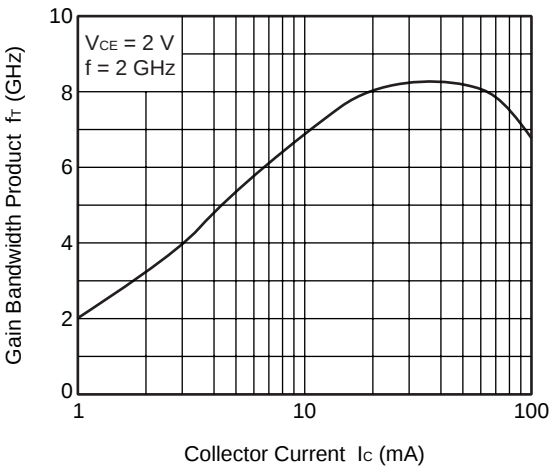




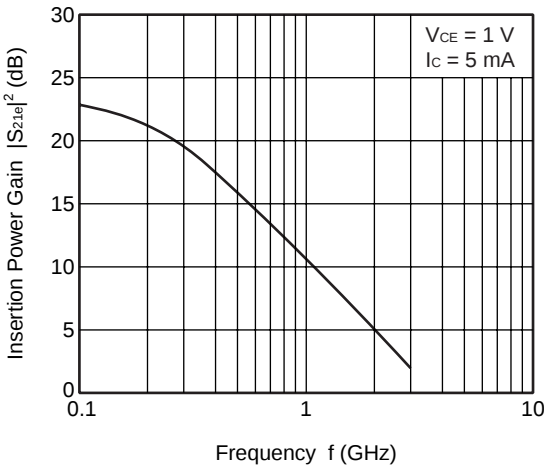
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



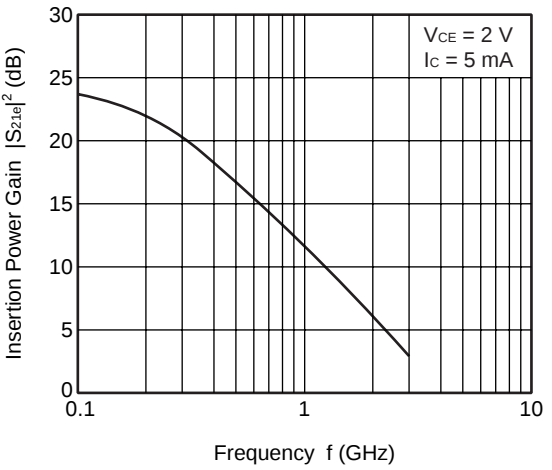
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



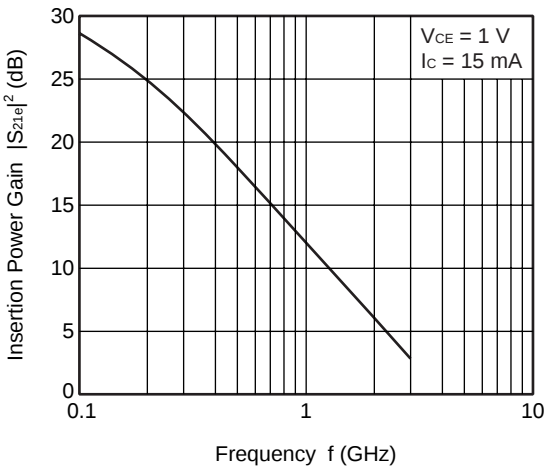
INSERTION POWER GAIN vs. FREQUENCY



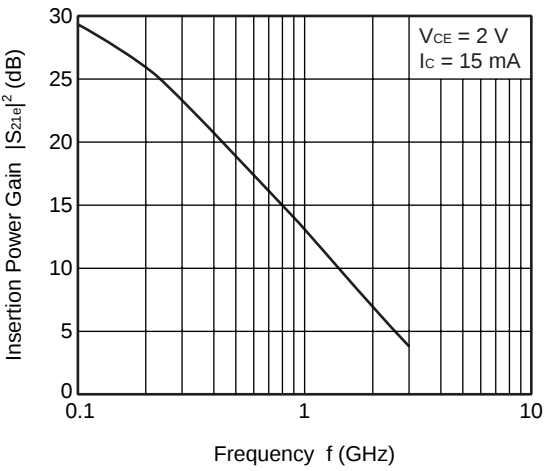
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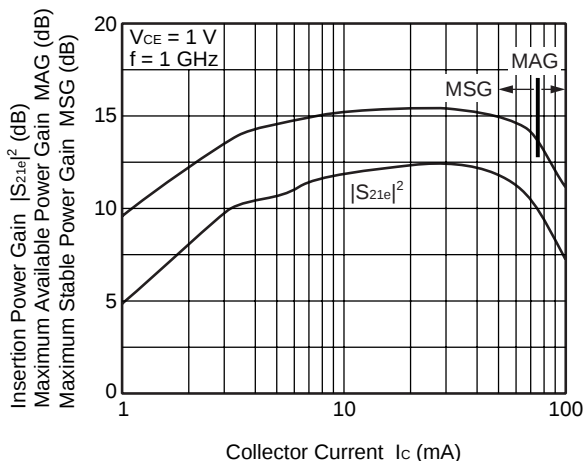
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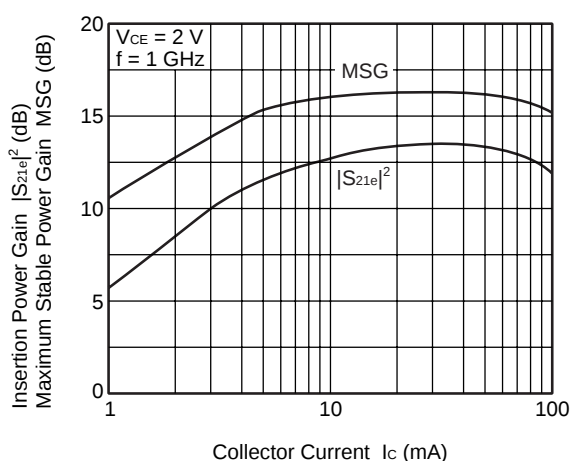
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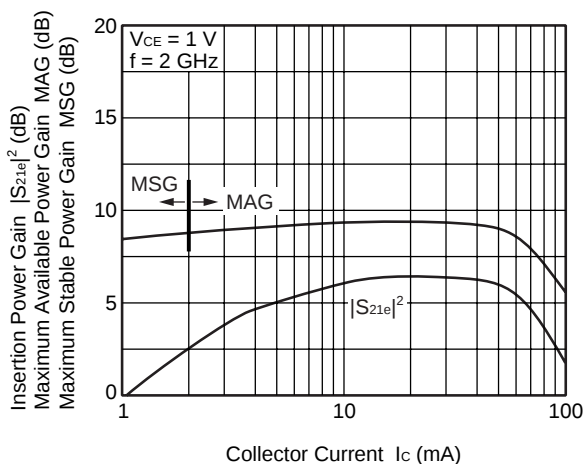
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



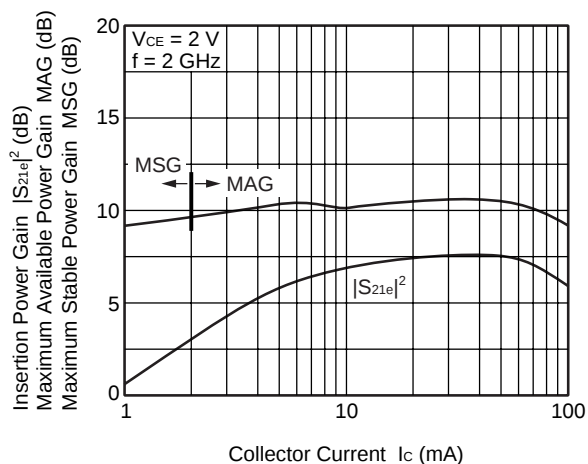
INSERTION POWER GAIN, MSG
vs. COLLECTOR CURRENT



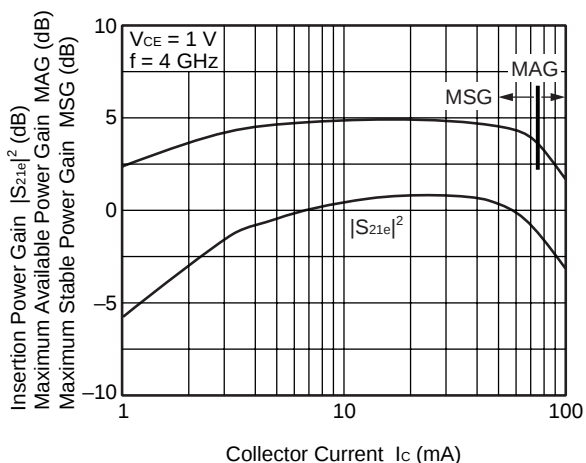
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



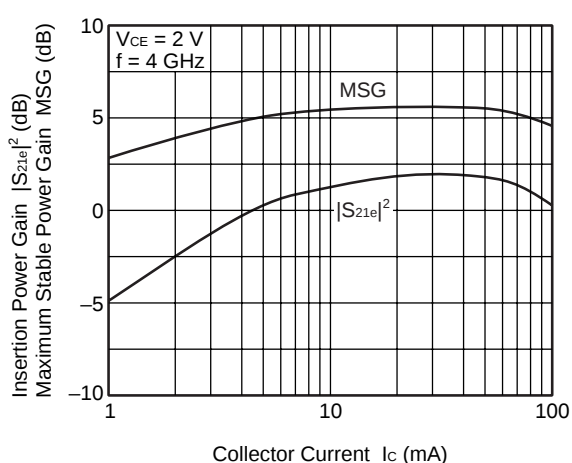
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



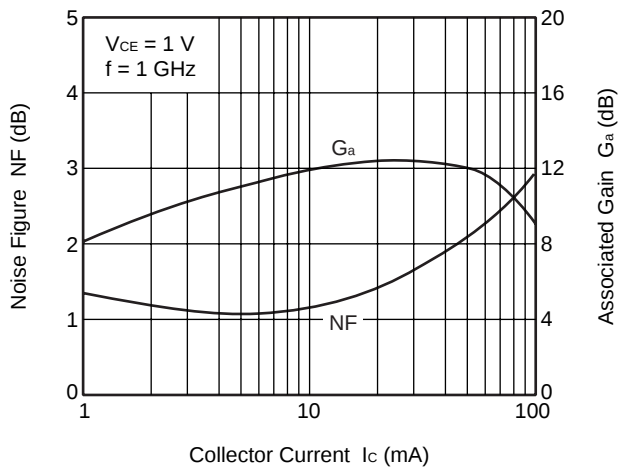
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



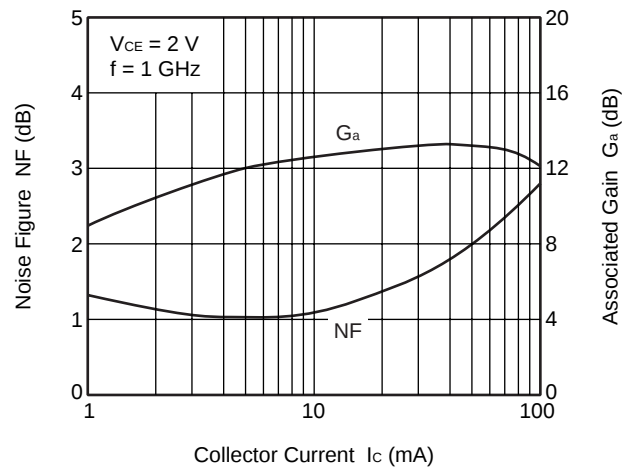
INSERTION POWER GAIN, MSG
vs. COLLECTOR CURRENT



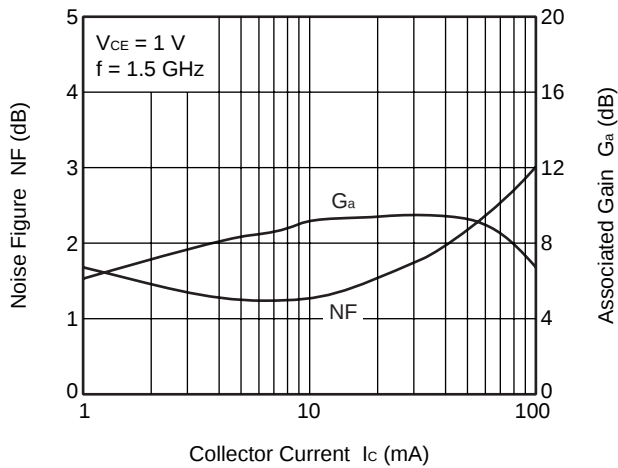
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



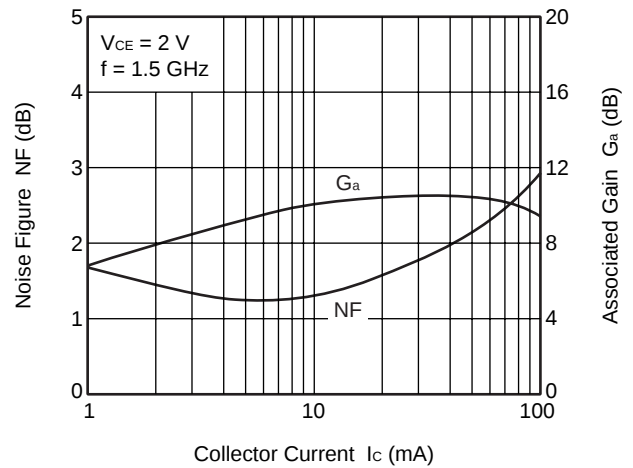
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



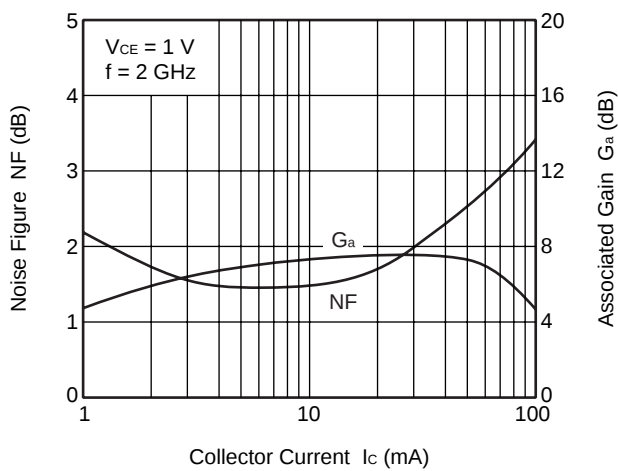
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



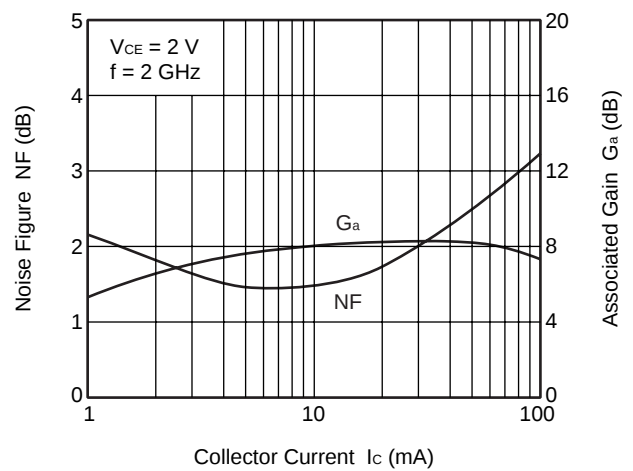
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

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

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

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

Frequency (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	MAG/MSG (dB)
	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)		
0.1	0.991	-19.4	3.621	166.8	0.048	87.1	0.999	-8.5	-0.113	18.76
0.2	0.984	-39.3	3.495	152.7	0.088	63.3	0.962	-15.4	0.147	15.98
0.3	0.946	-58.5	3.218	139.1	0.122	56.7	0.924	-22.5	0.113	14.22
0.4	0.896	-76.2	2.924	126.8	0.152	46.4	0.872	-28.3	0.171	12.84
0.5	0.851	-91.2	2.618	116.8	0.175	38.8	0.818	-33.2	0.208	11.75
0.6	0.816	-103.4	2.358	108.8	0.183	33.1	0.766	-37.2	0.241	11.09
0.7	0.790	-114.1	2.147	101.5	0.193	27.5	0.724	-40.7	0.288	10.45
0.8	0.787	-123.4	1.993	95.4	0.195	22.7	0.682	-43.6	0.316	10.10
0.9	0.774	-132.4	1.841	88.8	0.197	19.1	0.652	-46.3	0.356	9.69
1.0	0.771	-140.6	1.724	82.5	0.196	15.9	0.626	-48.9	0.387	9.45
1.1	0.760	-147.8	1.599	77.3	0.192	13.5	0.606	-51.4	0.431	9.21
1.2	0.751	-154.4	1.493	72.3	0.189	10.8	0.589	-53.9	0.484	8.98
1.3	0.744	-160.5	1.387	67.4	0.184	9.6	0.573	-56.6	0.542	8.78
1.4	0.738	-165.7	1.311	63.5	0.179	8.3	0.557	-59.7	0.598	8.65
1.5	0.737	-170.7	1.236	59.5	0.171	7.0	0.549	-62.8	0.657	8.59
1.6	0.737	-175.7	1.171	55.6	0.166	7.1	0.538	-65.6	0.713	8.50
1.7	0.741	-179.8	1.123	52.3	0.159	6.3	0.531	-69.4	0.755	8.50
1.8	0.750	-175.0	1.074	48.4	0.151	7.1	0.526	-72.6	0.785	8.51
1.9	0.750	-170.2	1.021	44.5	0.144	8.9	0.522	-76.2	0.854	8.49
2.0	0.752	-166.5	0.970	41.1	0.140	10.8	0.520	-80.3	0.918	8.42
2.1	0.752	-162.8	0.920	38.0	0.135	13.5	0.513	-84.5	1.012	7.69
2.2	0.756	-159.4	0.887	35.2	0.129	17.9	0.515	-88.9	1.064	6.84
2.3	0.757	-156.5	0.849	32.6	0.127	21.9	0.511	-93.0	1.131	6.05
2.4	0.767	-153.8	0.815	30.2	0.126	25.9	0.509	-98.0	1.141	5.82
2.5	0.772	-151.1	0.790	28.1	0.130	31.0	0.505	-102.7	1.130	5.64
2.6	0.771	-148.2	0.755	26.0	0.132	35.1	0.507	-107.2	1.193	4.92
2.7	0.782	-145.1	0.728	23.8	0.137	39.7	0.507	-111.8	1.157	4.86
2.8	0.782	-143.2	0.701	22.1	0.146	42.4	0.511	-116.4	1.139	4.54
2.9	0.781	-140.7	0.673	20.0	0.157	46.5	0.511	-120.8	1.145	4.02
3.0	0.785	-137.9	0.652	17.9	0.170	48.1	0.519	-125.6	1.079	4.13
4.0	0.824	-119.0	0.517	9.4	0.299	46.5	0.598	-173.1	0.911	2.38
5.0	0.820	-104.5	0.470	6.6	0.415	29.6	0.679	-153.2	0.966	0.54