DATA SHEET

NEC

NPN SILICON RF TWIN TRANSISTOR

μPA892TD

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

FEATURES

- Ideal for low noise · high-gain amplification and oscillation at 3 GHz or over
  NF = 1.1 dB TYP. @ V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz
- Maximum available power gain: MAG = 12.5 dB TYP. @ V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz
- High f_T: f_T = 21.0 GHz TYP. @ V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz
- 6-pin lead-less minimold package
- Built-in 2 transistors (2 × 2SC5668)

BUILT-IN TRANSISTORS

	Q1, Q2
3-pin thin-type ultra super minimold part No.	2SC5668

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA892TD	50 pcs (Non reel)	• 8 mm wide embossed taping
μPA892TD-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.

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

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ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	15	V
Collector to Emitter Voltage	V_{CEO}	3.3	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	35	mA
Total Power Dissipation	P_{tot} Note	115 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 $cm^2 \times 1.0$ mm (t) glass epoxy substrate

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	–	–	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 = 5 mA	50	70	100	–
Gain Bandwidth Product	f_T	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	18.0	21.0	–	GHz
Insertion Power Gain (1)	$\lvert S_{21e} \rvert^2$	V_{CE} = 1 V, I_C = 10 mA, f = 2 GHz	9.0	11.0	–	dB
Insertion Power Gain (2)	$\lvert S_{21e} \rvert^2$	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	9.5	11.5	–	dB
Noise Figure	NF	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.1	1.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 2 V, I_E = 0 mA, f = 1 MHz	–	0.24	0.3	pF
Maximum Available Power Gain	MAG Note 3	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	–	12.5	–	dB
Maximum Stable Power Gain	MSG Note 4	V_{CE} = 2 V, I_C = 20 mA, f = 2 GHz	–	13.5	–	dB

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

3. $MAG = \left| \frac{S_{21}}{S_{12}} \right| (k - \sqrt{(k^2 - 1)})$

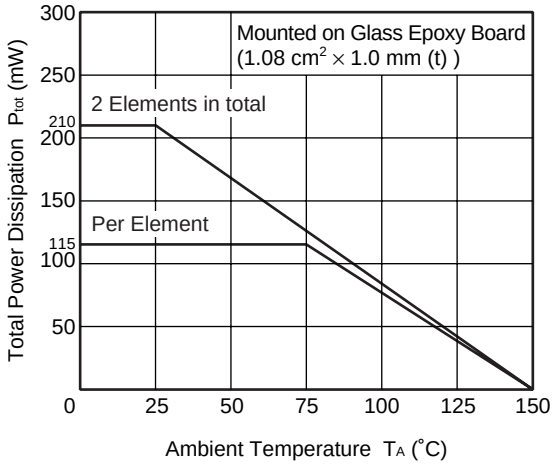
4. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

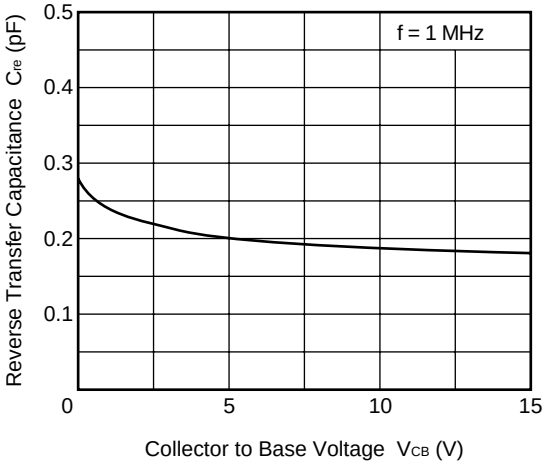
Rank	FB
Marking	kN
h_{FE} Value	50 to 100

TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

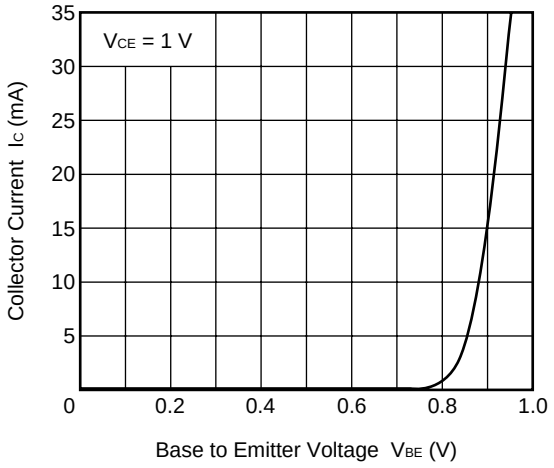
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



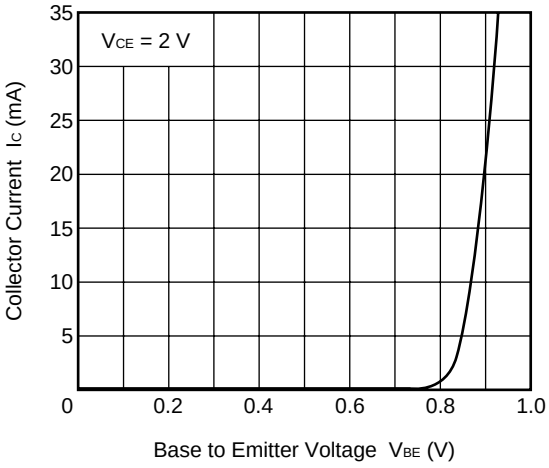
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



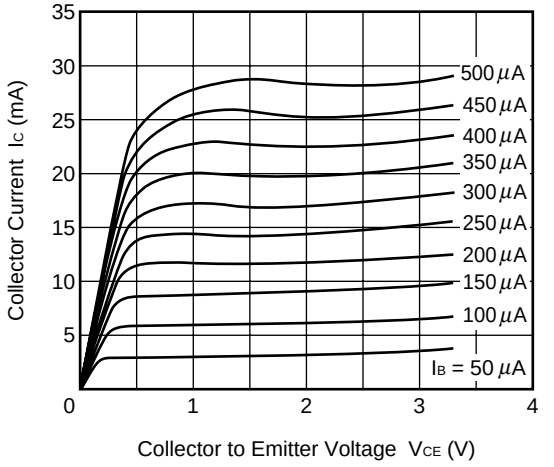
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



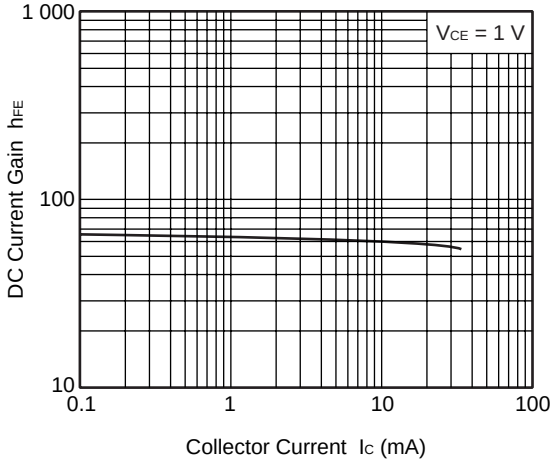
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



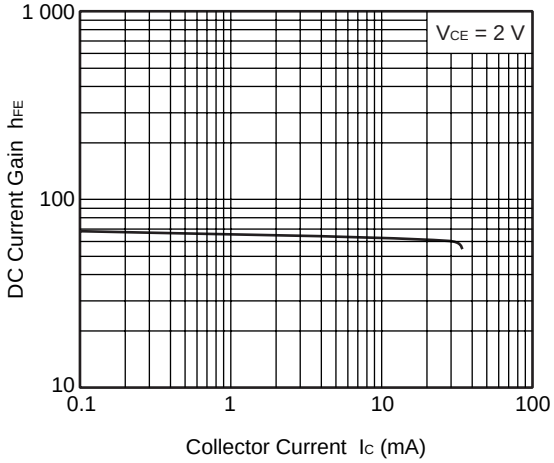
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



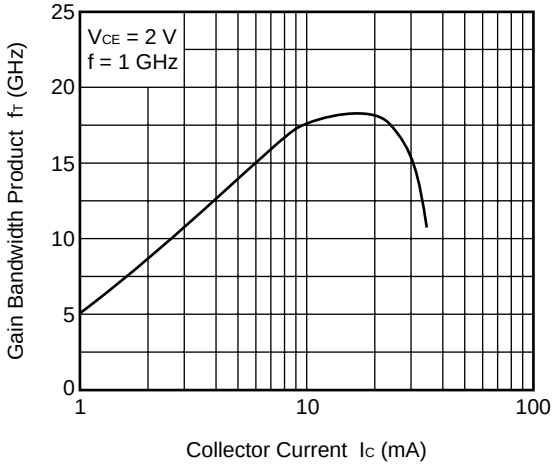
DC CURRENT GAIN vs.
COLLECTOR CURRENT



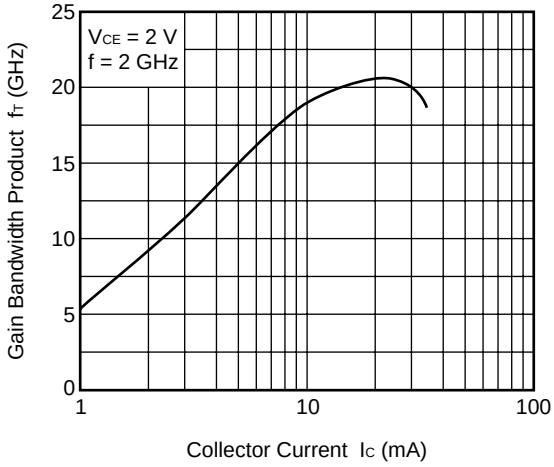
DC CURRENT GAIN vs.
COLLECTOR CURRENT



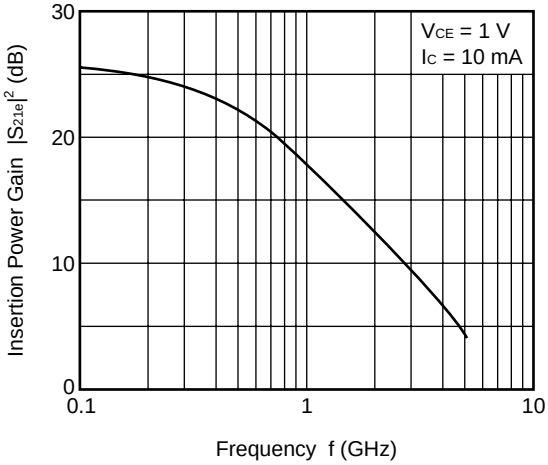
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



INSERTION POWER GAIN vs. FREQUENCY



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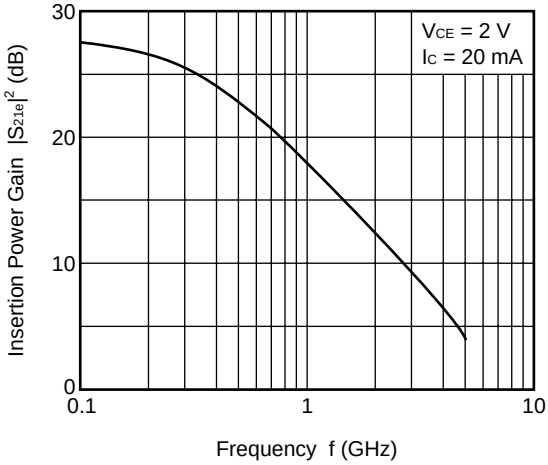
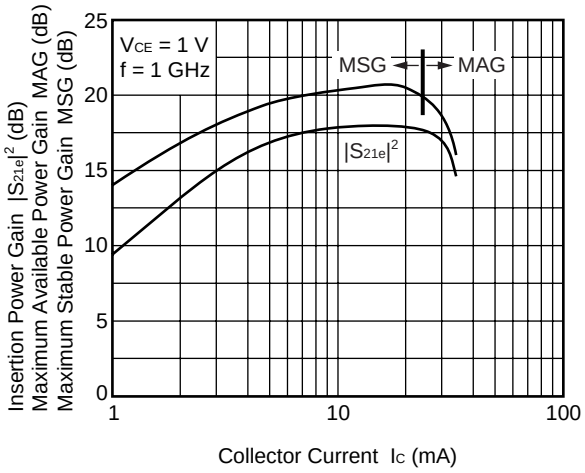


INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



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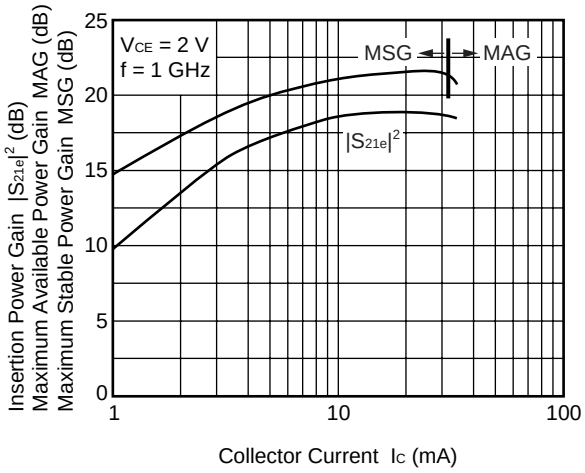

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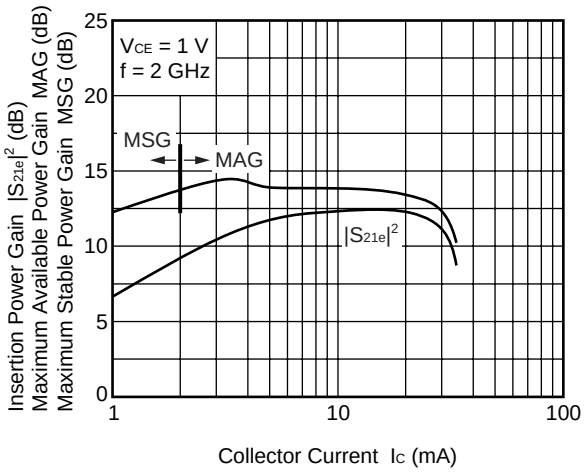

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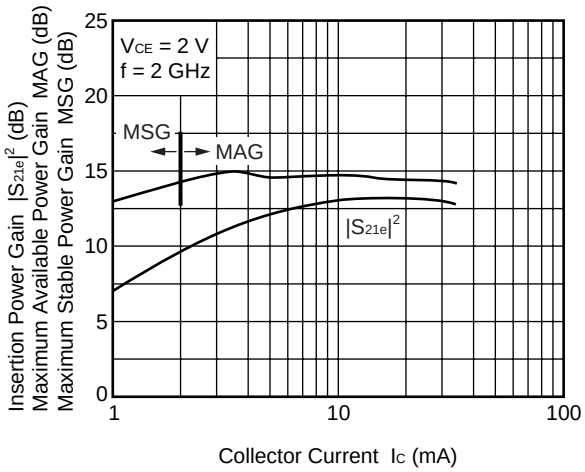
vs. COLLECTOR CURRENT



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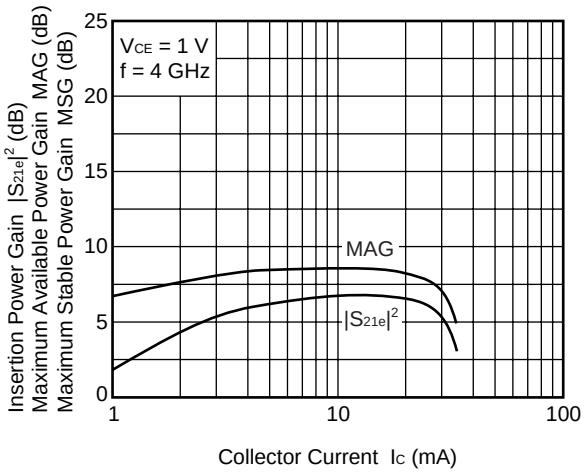

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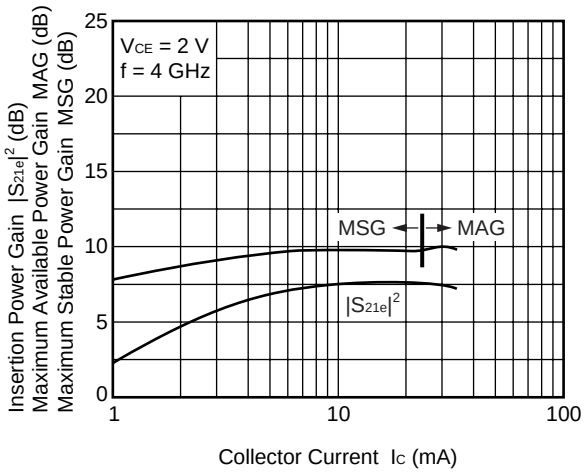
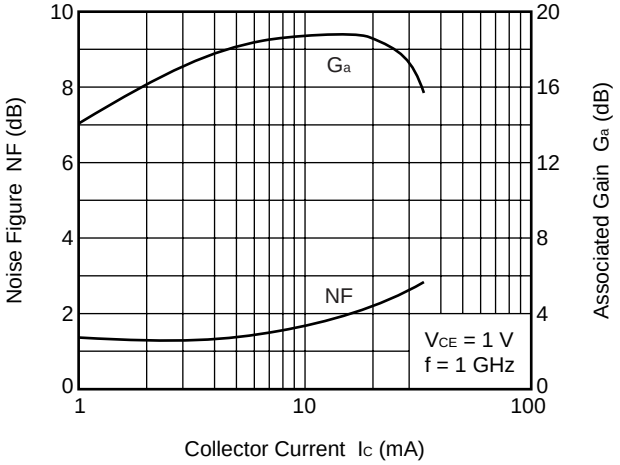


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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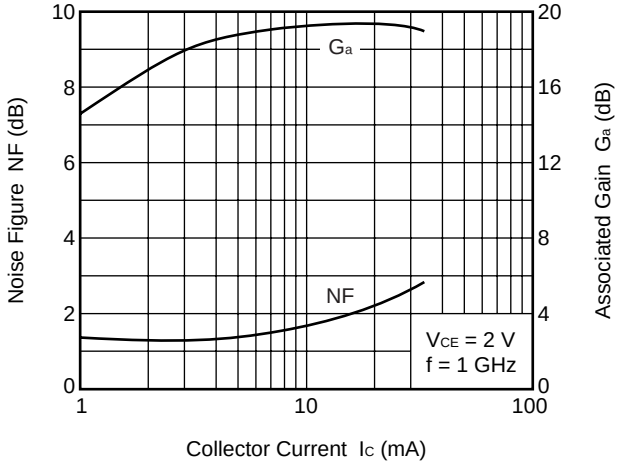
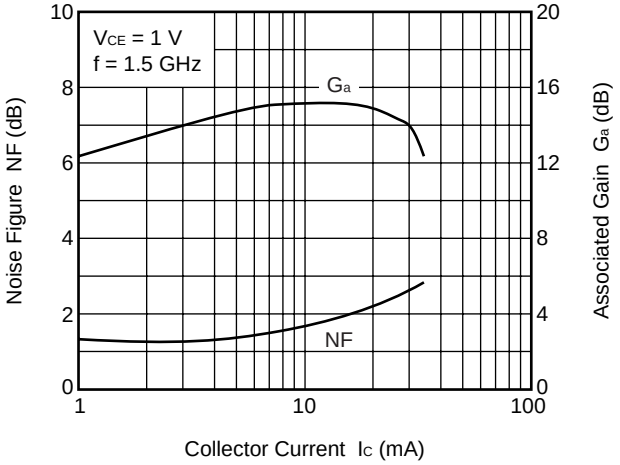
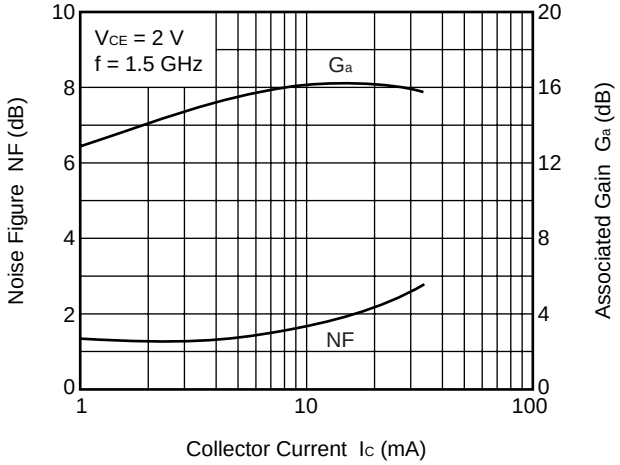


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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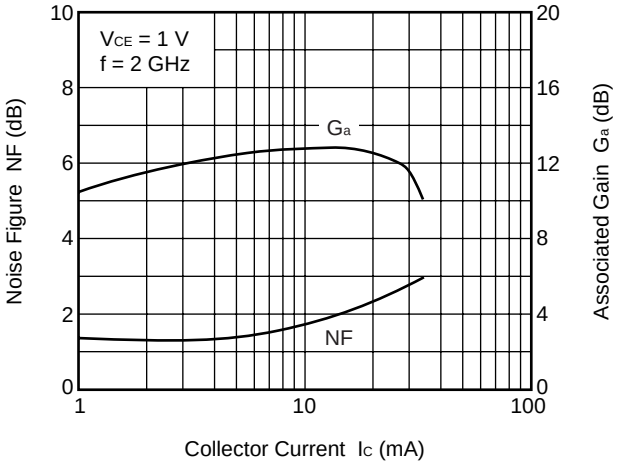

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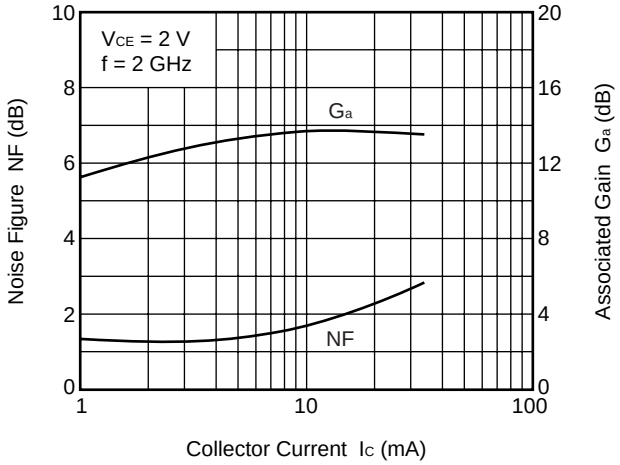

Remark The graphs indicate nominal characteristics.

S-PARAMETERS

Note When K ≥ 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 V, I_C = 1 mA, Z_O = 50 Ω

Frequency (GHz)	S_{11} MAG.	S_{11} ANG. (deg.)	S_{21} MAG.	S_{21} ANG. (deg.)	S_{12} MAG.	S_{12} ANG. (deg.)	S_{22} MAG.	S_{22} ANG. (deg.)	K	MAG/MSG (dB) Note
0.1	0.953	–5.4	3.383	174.6	0.015	82.4	1.001	–3.5	0.090	23.64
0.2	0.941	–10.7	3.363	170.1	0.029	82.2	0.991	–7.7	0.047	20.70
0.3	0.933	–16.5	3.345	164.0	0.043	77.3	0.984	–11.7	0.094	18.93
0.4	0.916	–22.3	3.315	157.8	0.057	73.2	0.969	–15.8	0.133	17.67
0.5	0.901	–27.5	3.304	152.8	0.070	69.1	0.956	–20.1	0.158	16.74
0.6	0.879	–33.9	3.262	146.7	0.082	65.0	0.932	–24.4	0.189	16.02
0.7	0.853	–39.4	3.204	141.4	0.093	60.8	0.910	–28.7	0.224	15.39
0.8	0.824	–45.3	3.134	135.9	0.102	56.8	0.883	–33.2	0.256	14.87
0.9	0.794	–51.2	3.062	130.4	0.111	53.0	0.860	–37.4	0.288	14.42
1.0	0.761	–56.8	2.991	125.2	0.117	49.2	0.831	–41.7	0.329	14.07
1.1	0.731	–62.7	2.916	120.1	0.123	45.6	0.808	–45.9	0.361	13.75
1.2	0.702	–68.5	2.817	115.2	0.127	42.3	0.783	–49.7	0.399	13.47
1.3	0.674	–74.4	2.735	110.6	0.130	39.1	0.762	–53.6	0.429	13.22
1.4	0.651	–80.1	2.638	106.0	0.133	36.5	0.741	–57.2	0.465	12.99
1.5	0.628	–85.6	2.552	101.7	0.133	34.0	0.725	–60.5	0.499	12.82
1.6	0.609	–91.0	2.469	97.5	0.134	31.6	0.705	–63.8	0.540	12.66
1.7	0.591	–96.4	2.373	93.7	0.133	29.6	0.693	–66.7	0.578	12.51
1.8	0.576	–101.4	2.282	89.9	0.131	28.0	0.676	–69.4	0.630	12.39
1.9	0.560	–106.4	2.205	86.6	0.130	26.6	0.668	–71.9	0.671	12.30
2.0	0.551	–111.0	2.128	82.8	0.127	25.8	0.652	–74.2	0.731	12.24
2.1	0.541	–115.6	2.066	79.9	0.124	25.5	0.645	–76.6	0.770	12.20
2.2	0.529	–120.1	1.989	76.7	0.121	25.3	0.632	–78.9	0.844	12.15
2.3	0.521	–124.6	1.927	73.8	0.118	25.7	0.628	–81.1	0.895	12.13
2.4	0.517	–128.6	1.871	70.6	0.115	26.2	0.617	–83.3	0.966	12.12
2.5	0.510	–133.1	1.821	67.8	0.111	27.5	0.612	–85.6	1.025	11.17
2.6	0.507	–137.1	1.761	65.3	0.108	28.7	0.604	–88.0	1.108	10.13
2.7	0.504	–140.9	1.712	62.6	0.105	30.7	0.599	–90.5	1.173	9.60
2.8	0.500	–144.7	1.657	60.1	0.103	32.9	0.594	–92.6	1.251	9.05
2.9	0.497	–148.1	1.609	56.8	0.102	35.3	0.585	–95.1	1.325	8.56
3.0	0.492	–152.5	1.567	54.2	0.101	38.7	0.577	–98.2	1.400	8.13
4.0	0.505	167.7	1.242	30.0	0.163	64.8	0.593	–127.0	1.118	6.74
5.0	0.536	124.0	0.896	9.2	0.293	51.7	0.660	–155.1	0.910	4.85