

NPN SILICON RF TRANSISTOR (WITH 2 ELEMENTS) IN A FLAT-LEAD 6-PIN THIN-TYPE ULTRA SUPER MINIMOLD

FEATURES

- 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 ($2 \times 2\text{SC}5800$)
- Flat-lead 6-pin thin-type ultra super minimold package

BUILT-IN TRANSISTORS

	Q1, Q2
3-pin thin-type ultra super minimold part No.	2SC5800

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μPA873TC	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 6 (Q1 Base), Pin 5 (Q2 Base), Pin 4 (Q2 Emitter) face the perforation side of the tape
μPA873TC-T1	3 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.
Unit sample quantity is 50 pcs.

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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}	200 in 1 element	mW
		230 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)

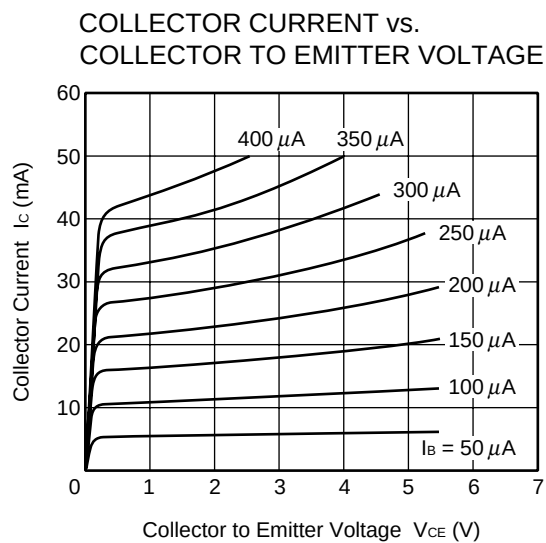
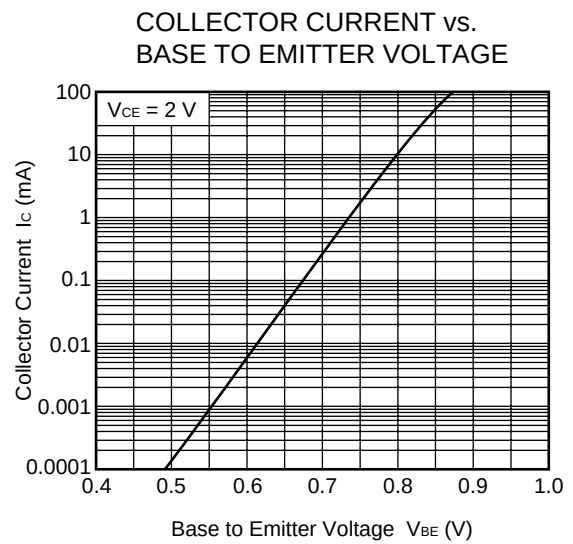
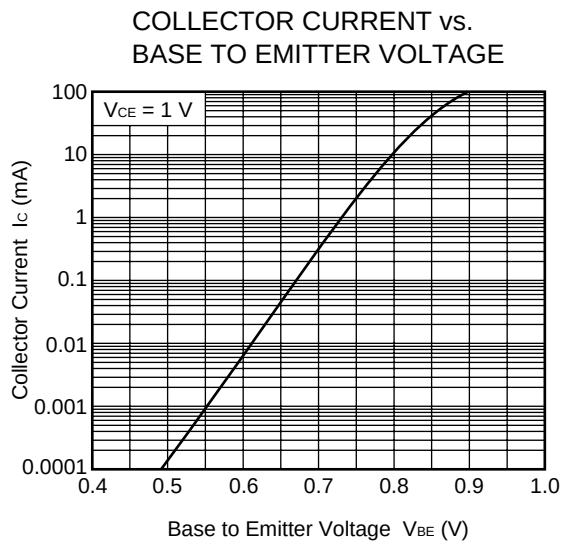
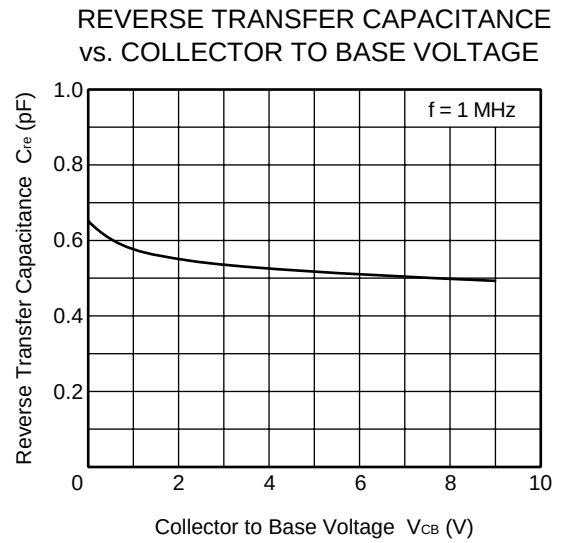
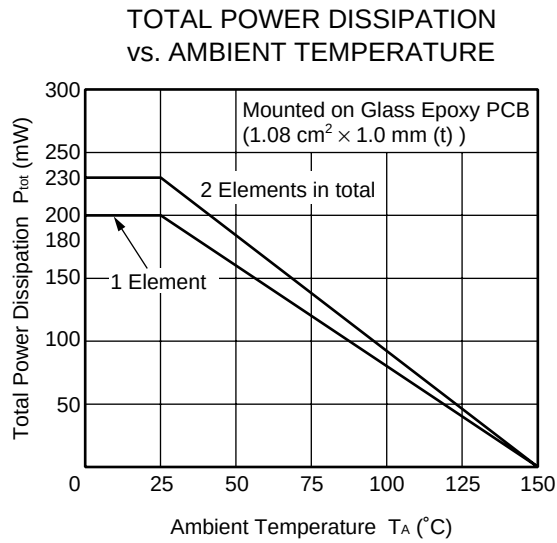
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	–	–	600	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 mA	–	–	600	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 5 mA	100	–	145	–
Gain Bandwidth Product (1)	f _T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

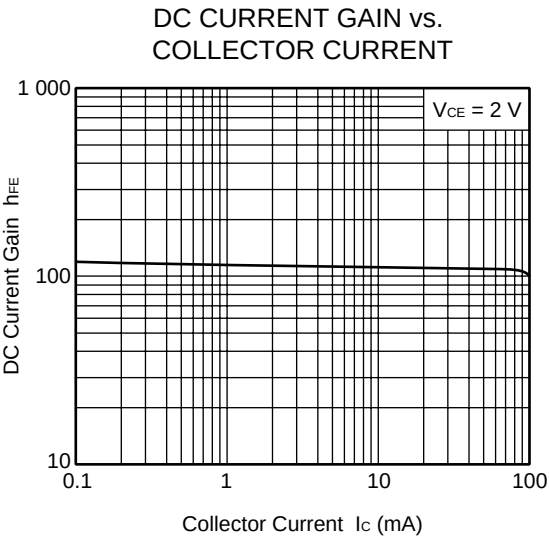
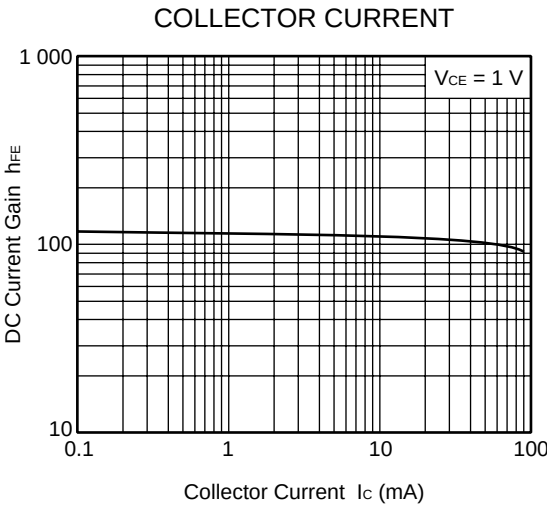
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

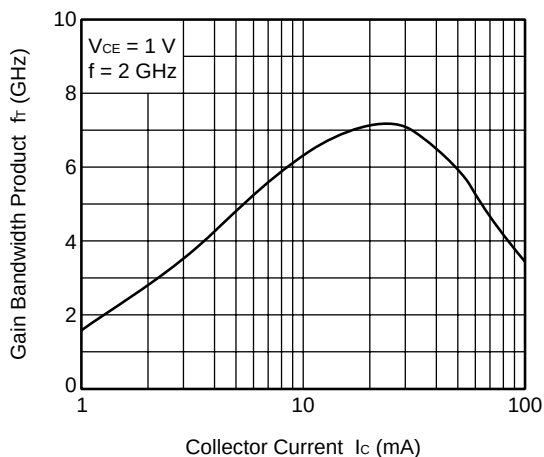
Rank	FB
Marking	3F
h _{FE}	100 to 145

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

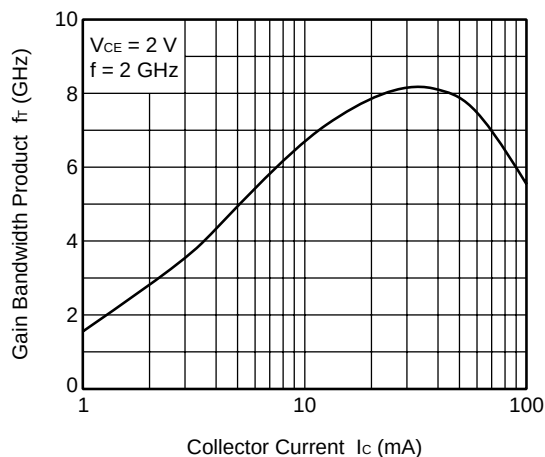




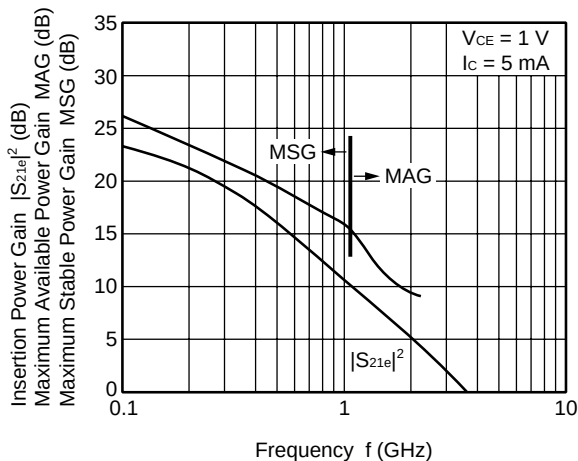
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



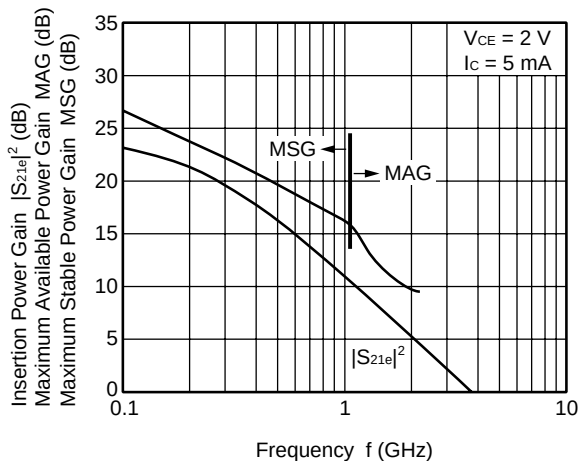
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



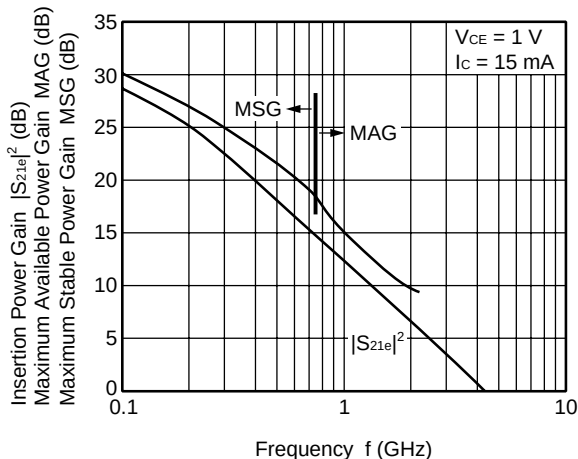
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



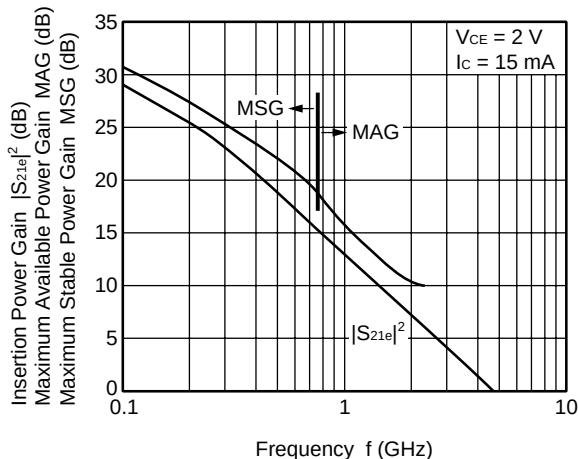
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



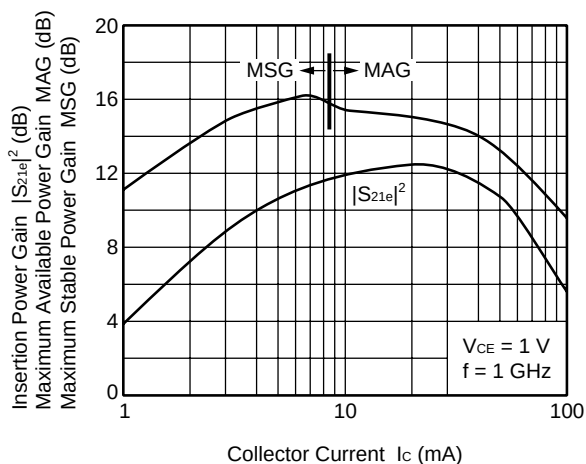
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



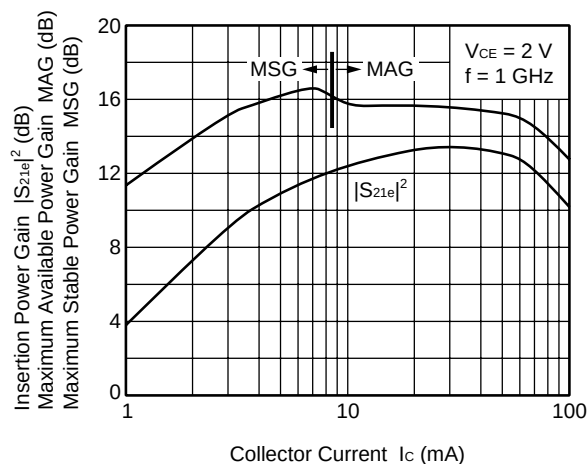
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



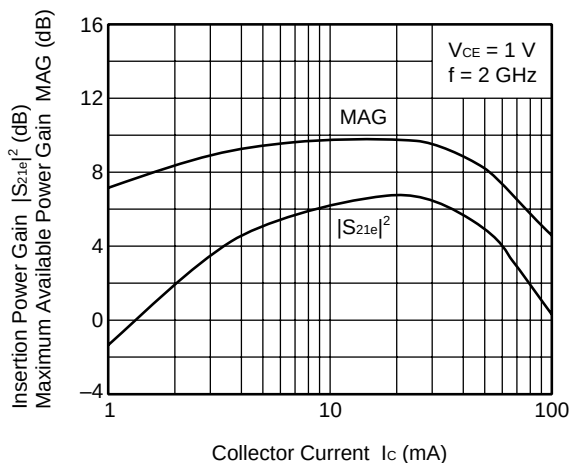
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



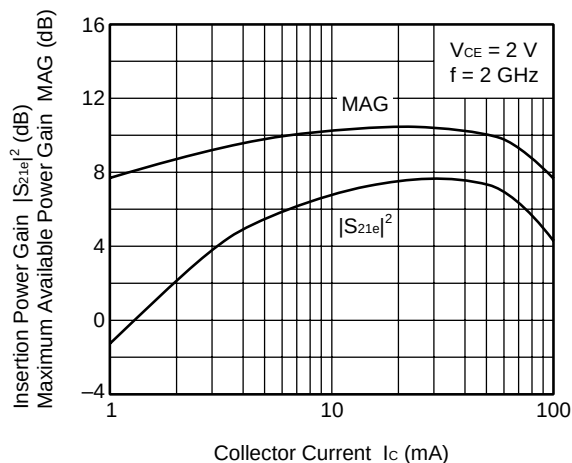
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



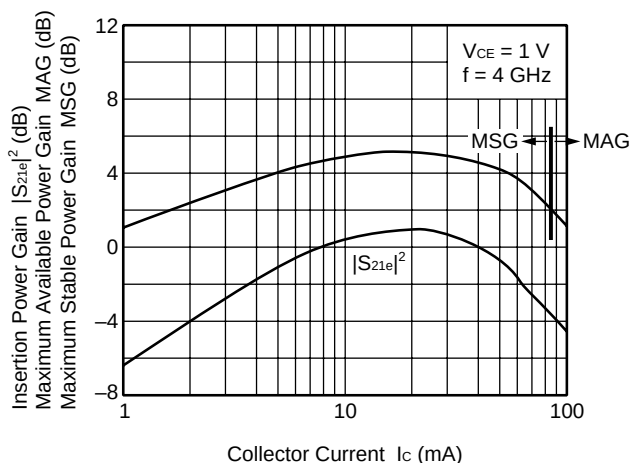
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



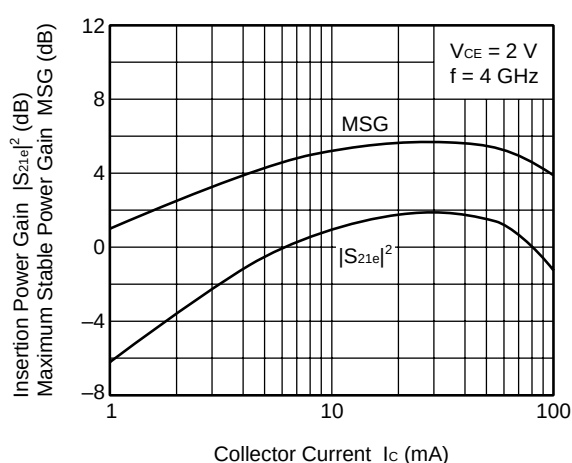
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT

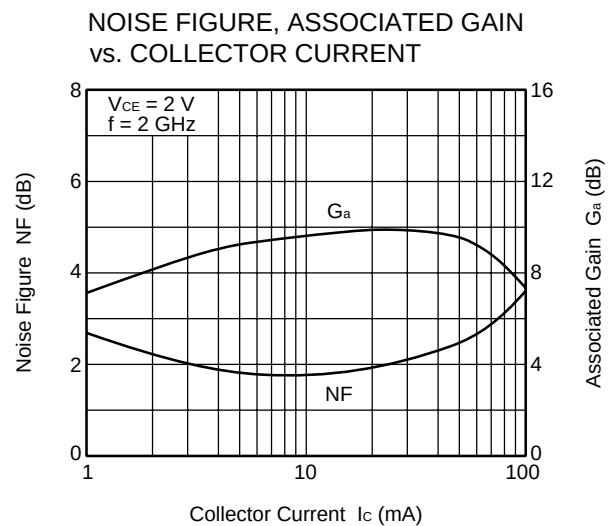
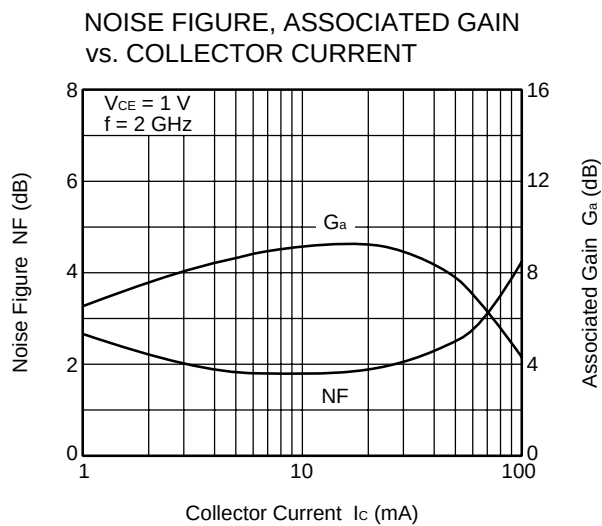
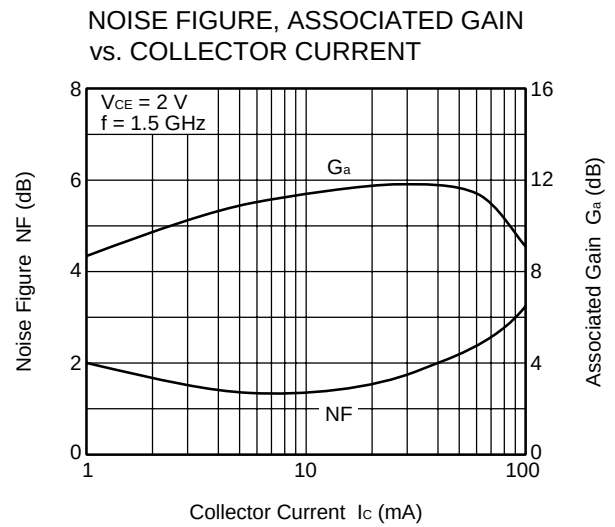
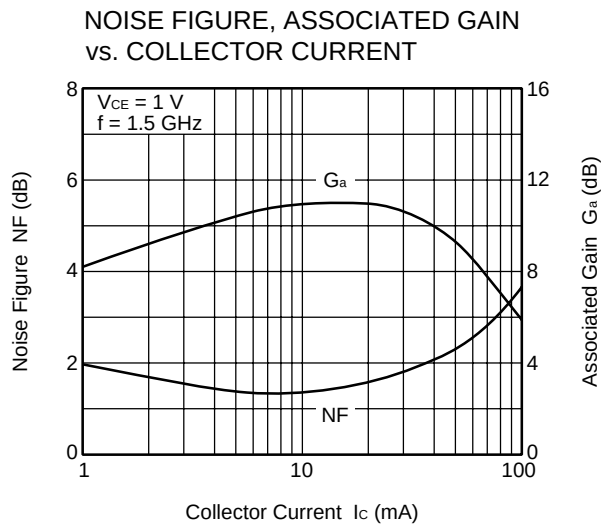
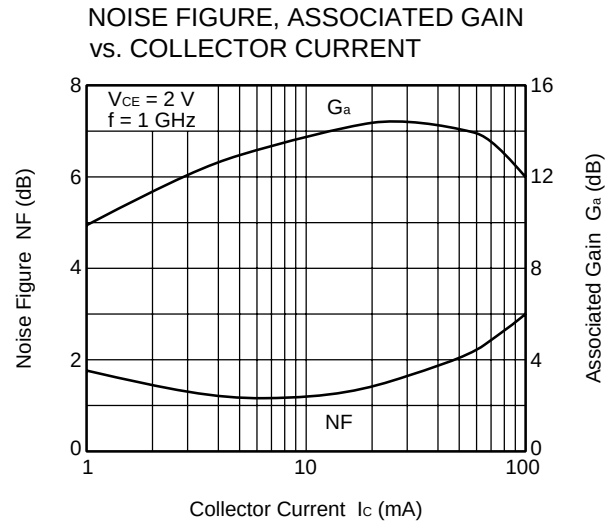
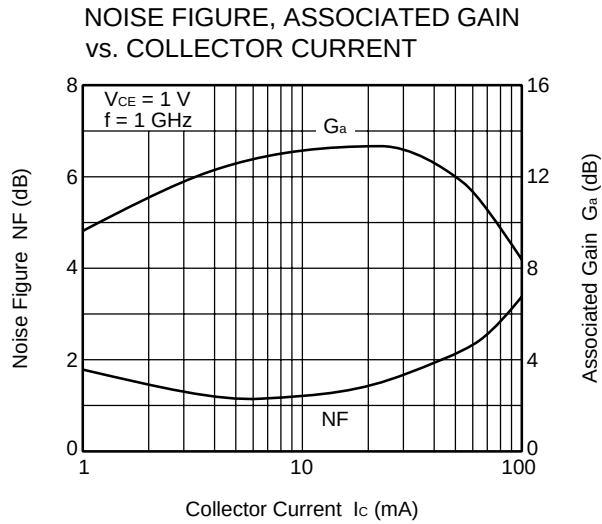


INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MSG
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	0.952	-23.2	3.464	165.0	0.039	75.8	0.987	-7.5
0.2	0.932	-46.1	3.323	148.7	0.069	63.4	0.948	-14.3
0.3	0.908	-67.1	3.079	135.6	0.094	52.4	0.899	-19.9
0.4	0.868	-84.6	2.757	123.7	0.111	42.6	0.850	-24.5
0.5	0.840	-99.6	2.469	113.6	0.121	35.0	0.807	-28.4
0.6	0.819	-112.9	2.226	105.2	0.127	28.6	0.770	-31.9
0.7	0.802	-124.0	2.006	97.2	0.129	23.4	0.742	-34.9
0.8	0.788	-133.7	1.821	90.3	0.128	19.4	0.719	-37.8
0.9	0.781	-142.1	1.671	84.2	0.125	15.9	0.698	-40.8
1.0	0.778	-149.9	1.539	78.8	0.121	13.4	0.683	-43.9
1.1	0.771	-156.4	1.426	73.5	0.115	11.7	0.670	-47.2
1.2	0.771	-162.7	1.333	68.5	0.108	10.7	0.658	-50.6
1.3	0.774	-168.2	1.243	64.0	0.101	10.9	0.649	-54.1
1.4	0.771	-173.4	1.168	59.7	0.094	12.3	0.644	-57.9
1.5	0.773	-178.5	1.101	55.6	0.086	15.2	0.638	-61.8
1.6	0.775	177.1	1.045	51.8	0.080	19.8	0.635	-65.8
1.7	0.779	172.9	0.989	48.0	0.075	26.6	0.631	-70.1
1.8	0.780	168.4	0.940	44.3	0.072	35.0	0.629	-74.6
1.9	0.783	164.5	0.891	41.1	0.073	44.5	0.629	-79.4
2.0	0.787	160.5	0.852	37.5	0.078	53.7	0.629	-84.1
2.1	0.794	157.0	0.810	34.5	0.086	60.9	0.630	-88.9
2.2	0.797	153.6	0.775	32.5	0.098	66.3	0.632	-93.8
2.3	0.802	150.5	0.739	30.4	0.111	69.8	0.633	-98.8
2.4	0.804	147.5	0.704	28.1	0.127	71.7	0.636	-103.8
2.5	0.805	144.8	0.675	26.5	0.144	72.0	0.639	-108.6
2.6	0.805	142.0	0.646	24.3	0.161	71.1	0.642	-113.4
2.7	0.807	140.1	0.621	23.0	0.174	69.1	0.643	-117.9
2.8	0.812	138.2	0.595	21.4	0.183	68.8	0.648	-122.0
2.9	0.812	135.6	0.580	20.1	0.196	69.2	0.648	-126.4
3.0	0.820	133.2	0.560	19.9	0.213	68.8	0.652	-131.1
4.0	0.836	113.0	0.477	13.6	0.377	47.5	0.671	-178.4
5.0	0.847	100.5	0.457	7.3	0.441	26.6	0.725	140.3

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	-34.7	9.492	158.3	0.035	71.4	0.945	-14.6
0.2	0.819	-65.5	8.394	137.9	0.060	56.0	0.834	-25.9
0.3	0.764	-90.2	7.116	123.5	0.075	45.8	0.726	-32.8
0.4	0.719	-108.8	5.951	112.3	0.084	39.1	0.640	-37.4
0.5	0.689	-122.9	5.062	103.5	0.088	34.9	0.574	-40.2
0.6	0.671	-134.8	4.394	96.6	0.091	32.4	0.528	-42.8
0.7	0.663	-144.2	3.853	90.4	0.092	31.2	0.494	-44.5
0.8	0.652	-152.1	3.424	84.9	0.092	30.7	0.467	-46.5
0.9	0.647	-158.9	3.091	80.2	0.092	31.1	0.446	-48.6
1.0	0.648	-165.0	2.813	75.9	0.093	32.4	0.429	-51.0
1.1	0.646	-170.2	2.585	71.7	0.092	34.1	0.415	-53.5
1.2	0.649	-175.2	2.396	67.8	0.093	36.2	0.403	-56.5
1.3	0.651	-179.4	2.226	64.0	0.094	38.6	0.394	-59.6
1.4	0.651	176.5	2.081	60.4	0.096	41.4	0.387	-63.0
1.5	0.658	172.4	1.953	57.0	0.099	44.4	0.381	-66.7
1.6	0.662	169.0	1.849	53.6	0.102	47.2	0.377	-70.5
1.7	0.669	165.5	1.749	50.4	0.107	50.2	0.373	-74.7
1.8	0.670	161.9	1.659	47.0	0.112	52.7	0.371	-79.1
1.9	0.675	158.9	1.575	44.0	0.119	55.0	0.370	-83.7
2.0	0.684	155.4	1.505	40.6	0.126	57.1	0.371	-88.3
2.1	0.691	152.7	1.432	37.7	0.135	58.6	0.373	-93.1
2.2	0.693	149.9	1.371	35.2	0.144	59.8	0.375	-97.9
2.3	0.703	147.6	1.316	32.7	0.154	60.5	0.379	-102.9
2.4	0.707	145.1	1.254	30.1	0.165	60.8	0.385	-107.7
2.5	0.712	143.0	1.204	27.7	0.177	60.5	0.392	-112.4
2.6	0.716	140.7	1.150	25.0	0.189	59.7	0.400	-117.0
2.7	0.724	139.5	1.109	23.1	0.197	58.4	0.406	-121.3
2.8	0.732	137.7	1.065	20.9	0.203	58.0	0.414	-125.2
2.9	0.734	135.5	1.036	18.8	0.212	58.4	0.419	-129.6
3.0	0.743	133.4	0.999	17.1	0.224	58.4	0.425	-133.9
4.0	0.800	115.7	0.736	0.7	0.354	44.2	0.493	-178.7
5.0	0.843	102.3	0.578	-7.8	0.424	26.5	0.619	140.5