

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

FEATURES

- Low voltage operation
- 2 different built-in transistors (2SC5436, 2SC5800)
 - Q1: Built-in high gain transistor
 $f_T = 12.0 \text{ GHz TYP.}$, $|S_{21e}|^2 = 9.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_C = 10 \text{ mA, } f = 2 \text{ GHz}$
 - Q2: Built-in low phase distortion transistor suited for OSC operation
 $f_T = 4.5 \text{ GHz TYP.}$, $|S_{21e}|^2 = 4.0 \text{ dB TYP. @ } V_{CE} = 1 \text{ V, } I_C = 5 \text{ mA, } f = 2 \text{ GHz}$
- 6-pin lead-less minimold package

BUILT-IN TRANSISTORS

	Q1	Q2
3-pin thin-type ultra super minimold part No.	2SC5436	2SC5800

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
μ PA863TD	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 PA863TD-T3	10 kpcs/reel	

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.

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.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings		Unit
		Q1	Q2	
Collector to Base Voltage	V _{CBO}	5	9	V
Collector to Emitter Voltage	V _{CEO}	3	5.5	V
Emitter to Base Voltage	V _{EBO}	2	1.5	V
Collector Current	I _C	30	100	mA
Total Power Dissipation	P _{tot} ^{Note}	90	190	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)

(1) Q1

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} = 1 V, I _C = 10 mA	70	110	140	—
Gain Bandwidth Product	f _T	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	10.0	12.0	—	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz	7.0	9.0	—	dB
Noise Figure	NF	V _{CE} = 1 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	0.7	pF

(2) Q2

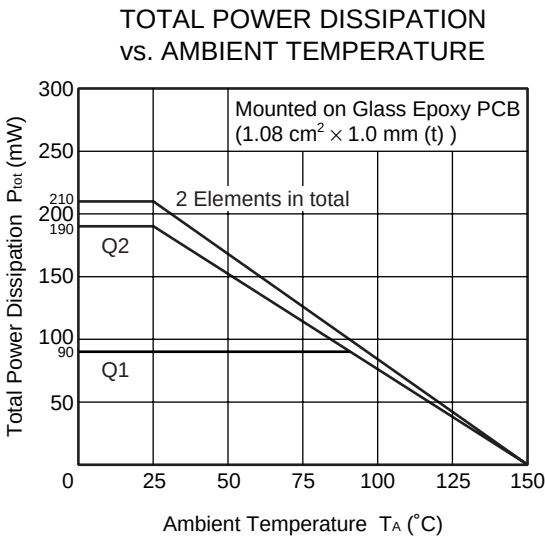
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	—	—	600	nA
Emitter Cut-off Current	I _{EBO}	V _{BE} = 1 V, I _C = 0 mA	—	—	600	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 5 mA	100	120	145	—
Gain Bandwidth Product (1)	f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

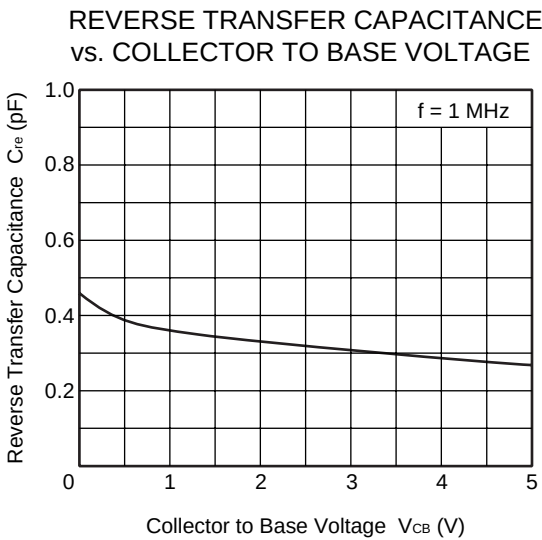
h_{FE} CLASSIFICATION

Rank	FB
Marking	xC
h _{FE} Value of Q1	70 to 140
h _{FE} Value of Q2	100 to 145

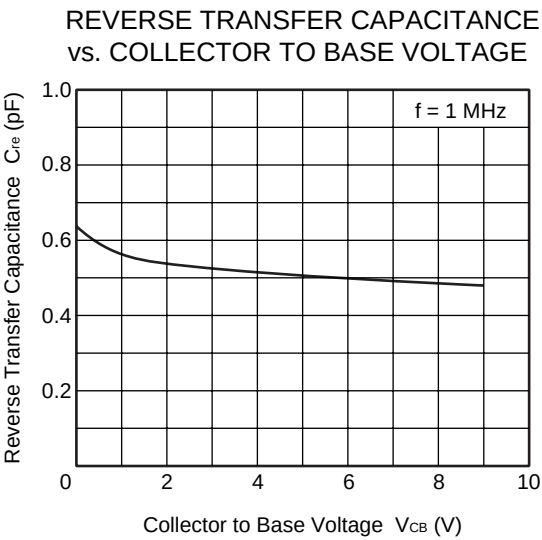
TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^{\circ}\text{C}$)



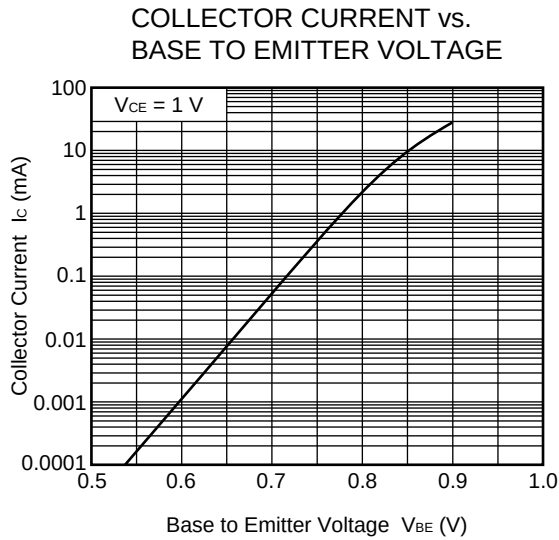
Q1



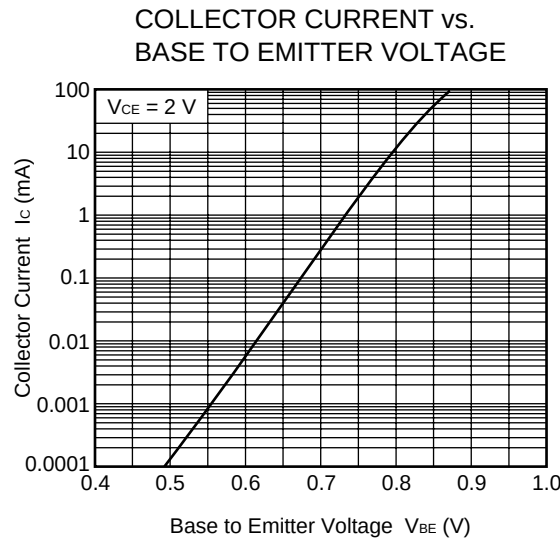
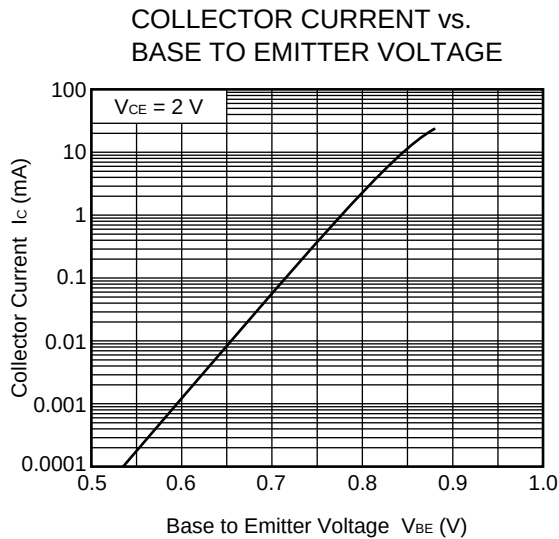
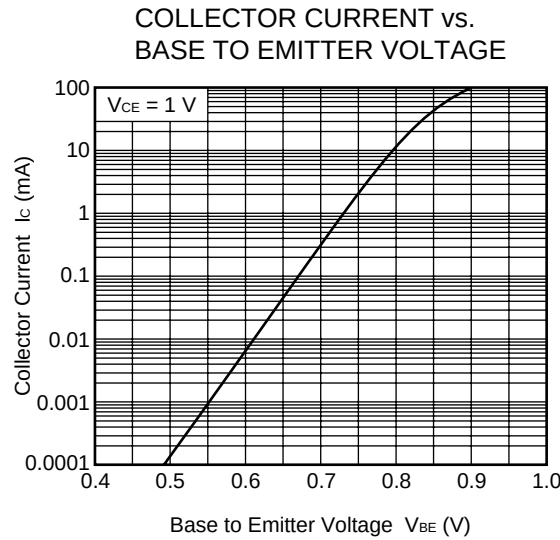
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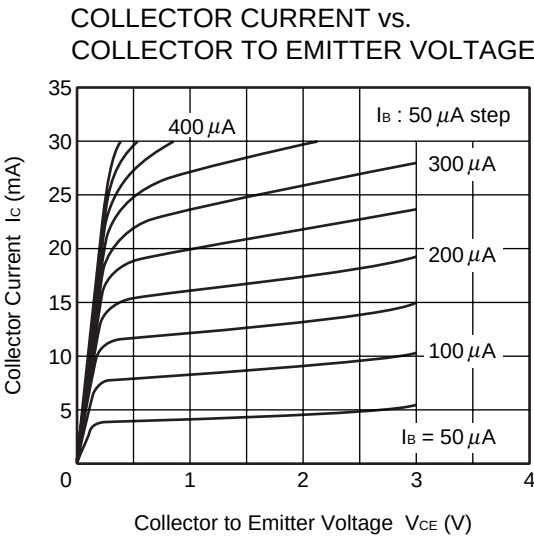
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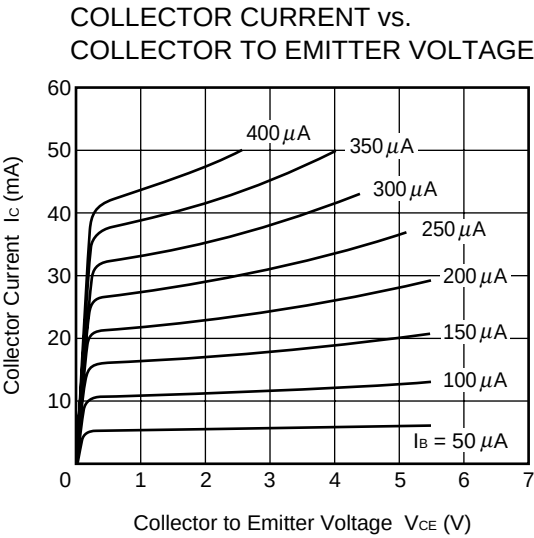
Q2



Q1

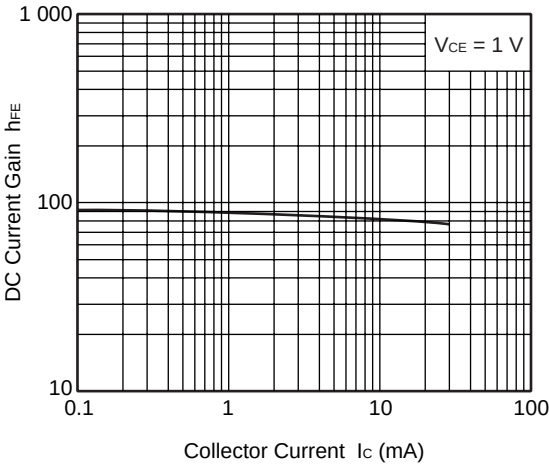


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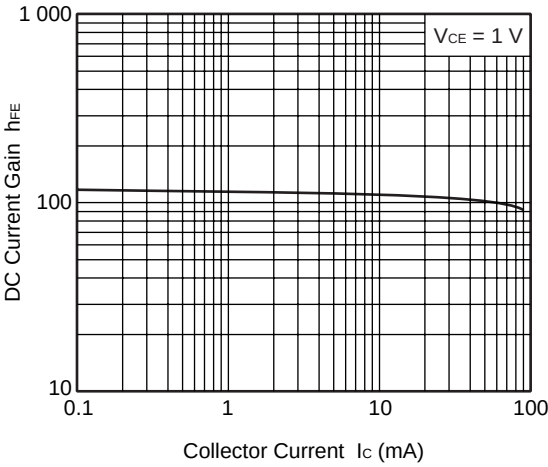
Q1

DC CURRENT GAIN vs.
COLLECTOR CURRENT

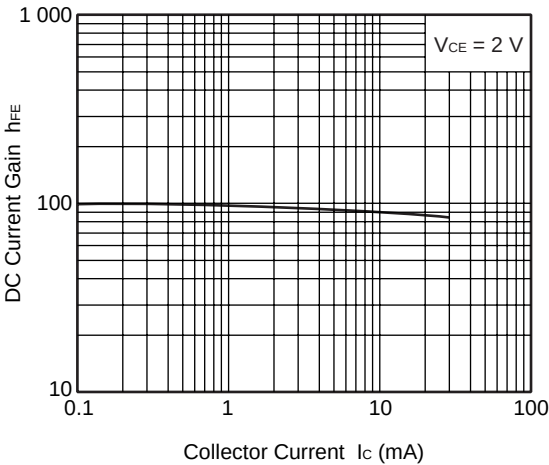


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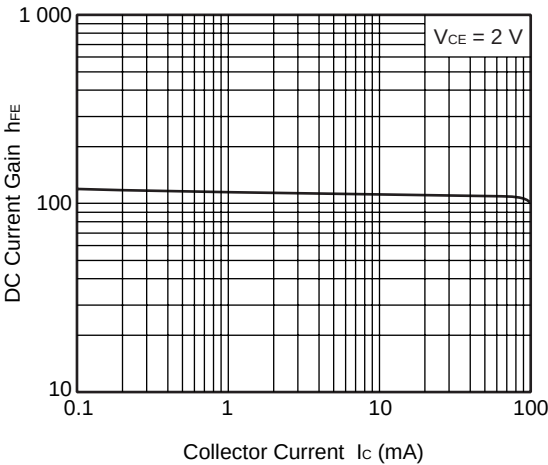
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT

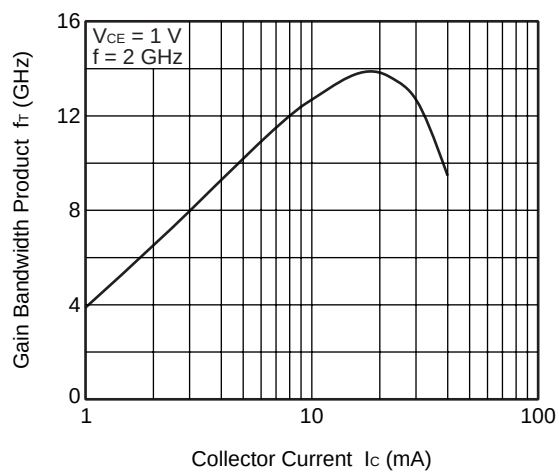


DC CURRENT GAIN vs.
COLLECTOR CURRENT



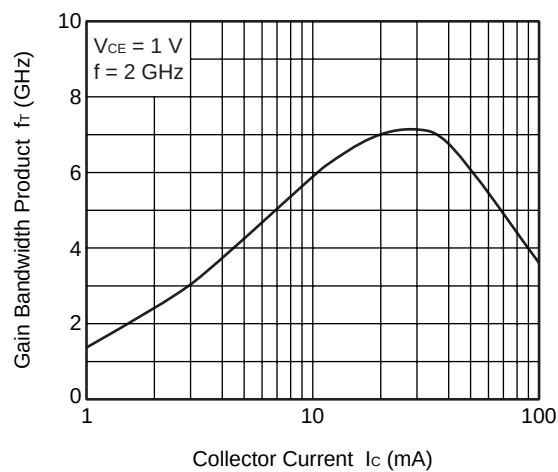
Q1

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

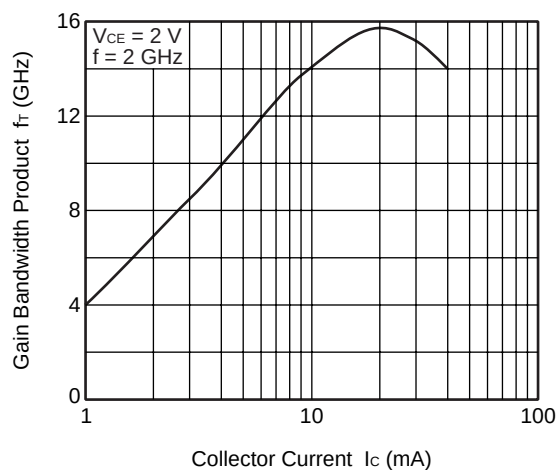


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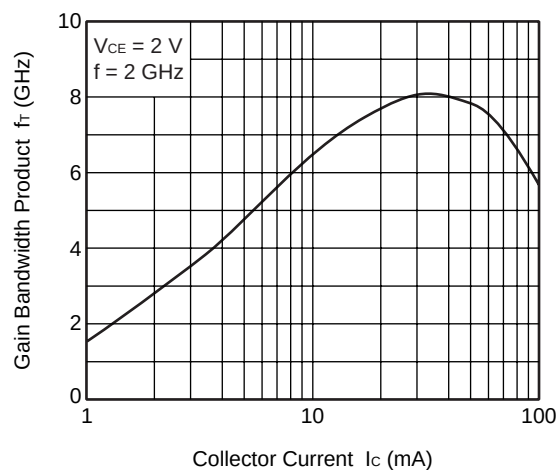
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

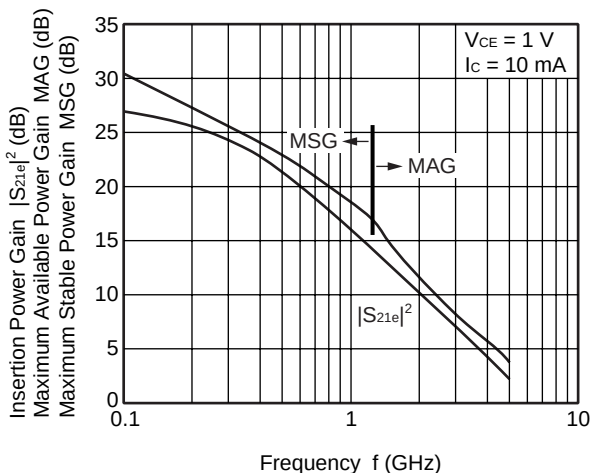


GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



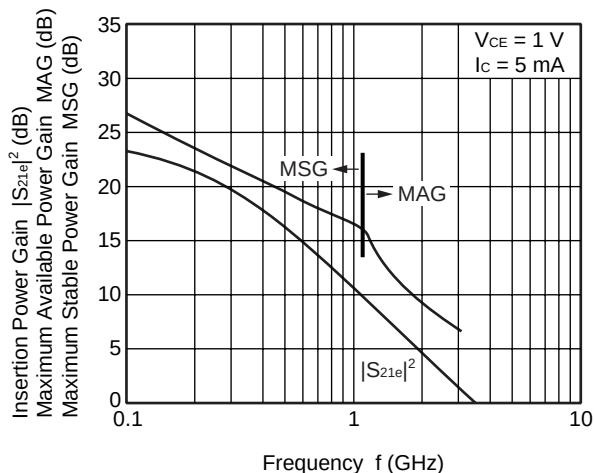
Q1

INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY

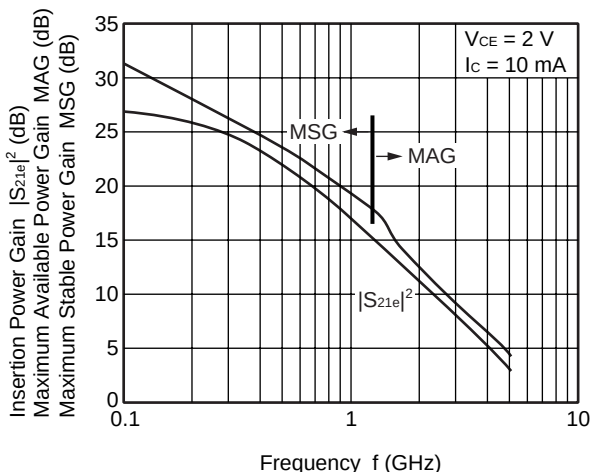


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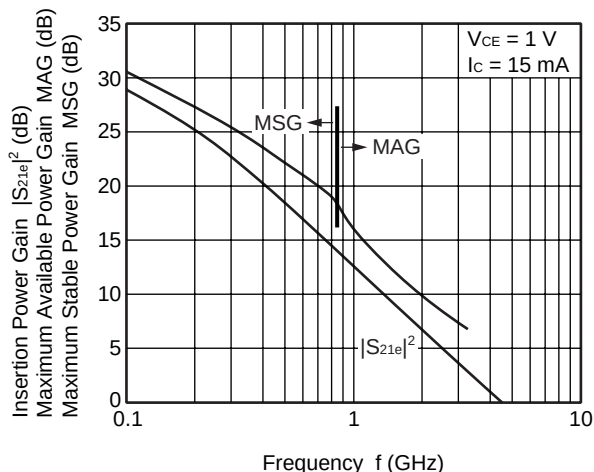
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



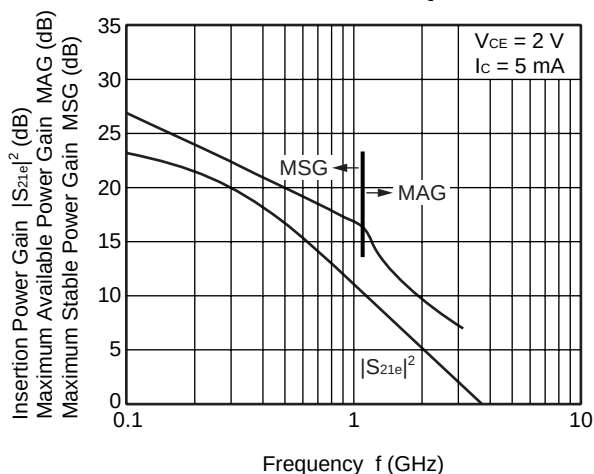
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY

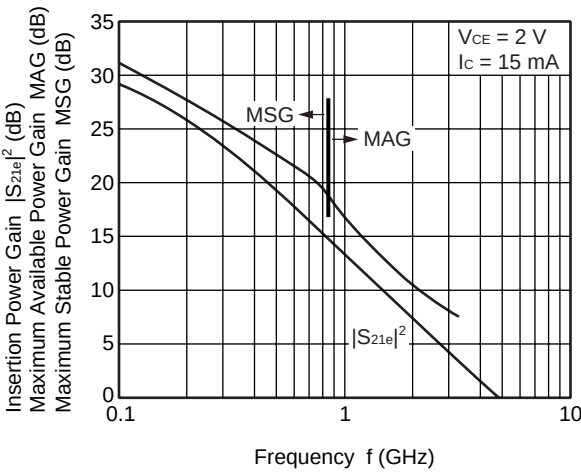


INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



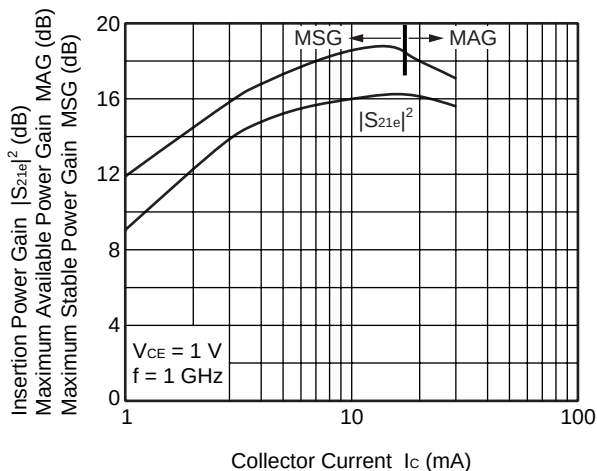
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INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



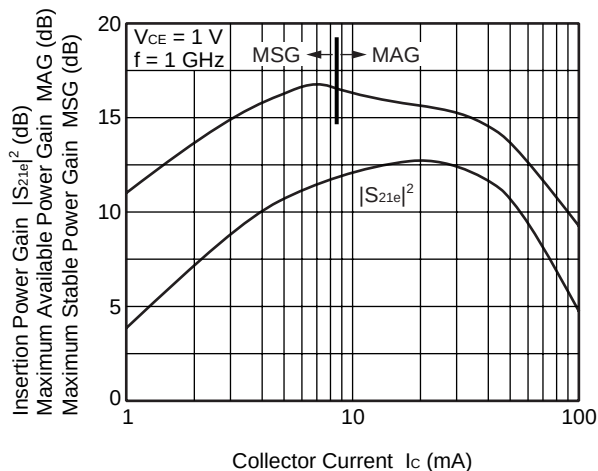
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INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

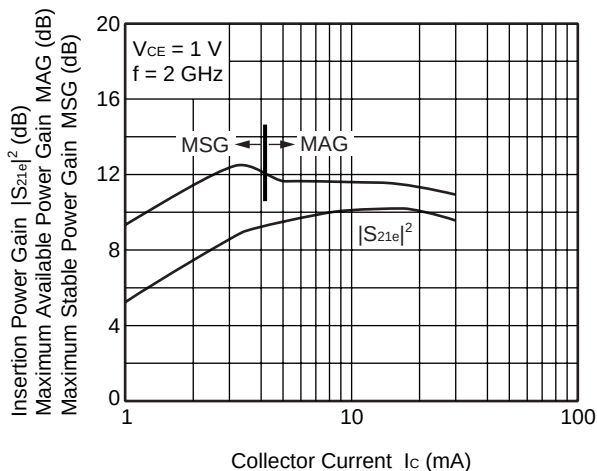


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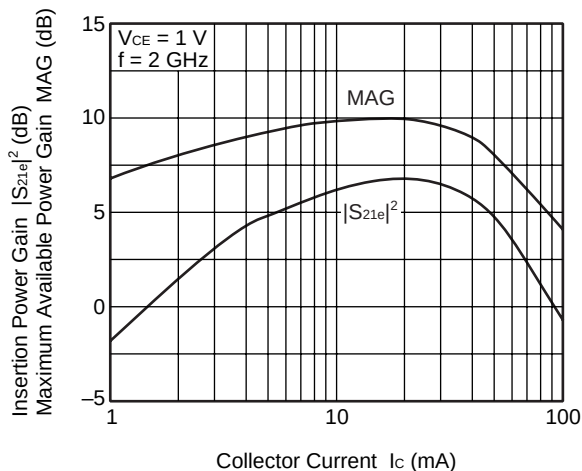
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



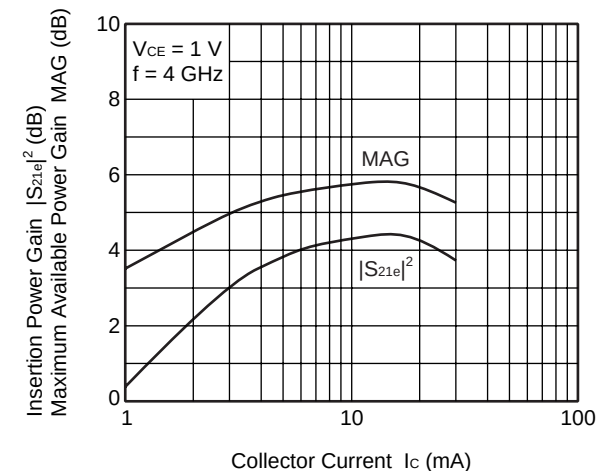
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



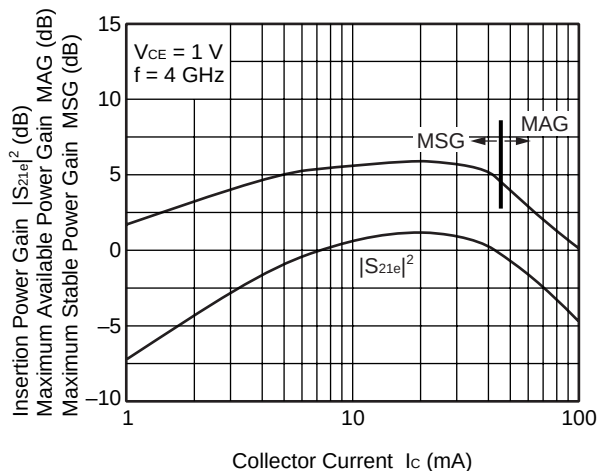
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT

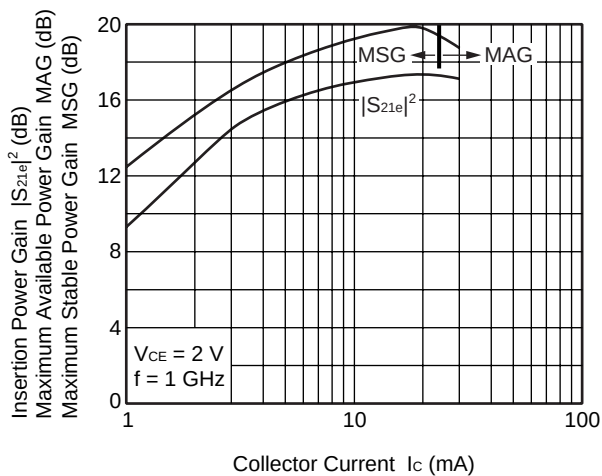


INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



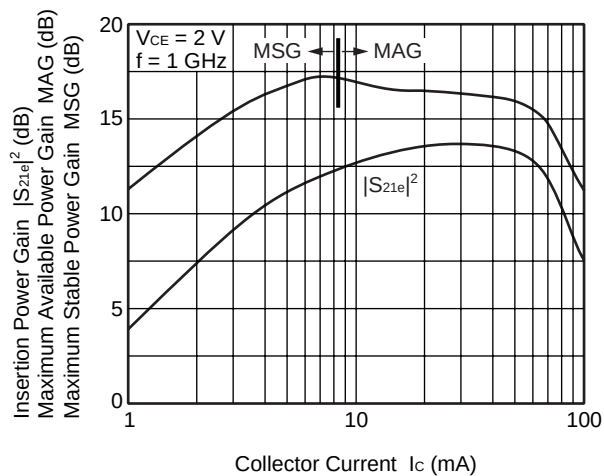
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INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

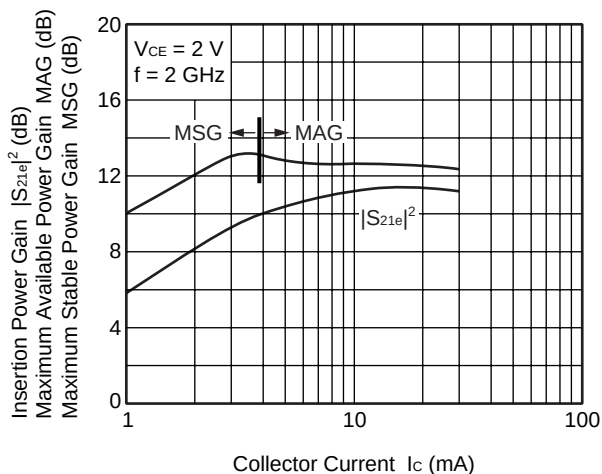


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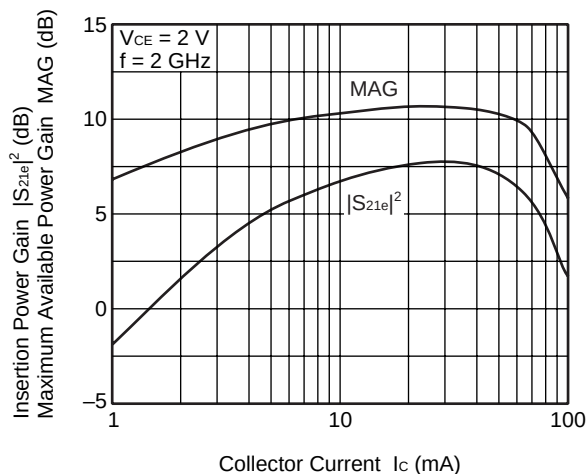
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



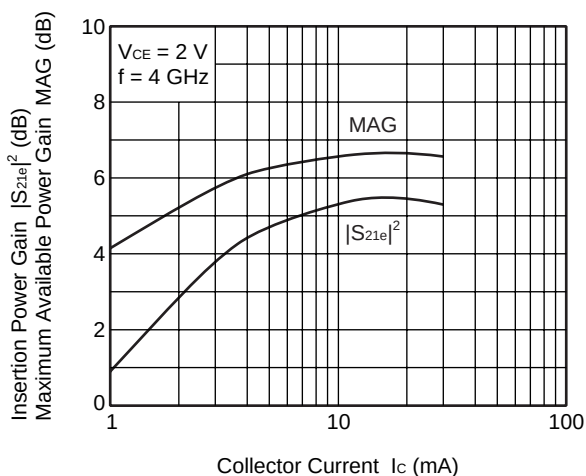
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



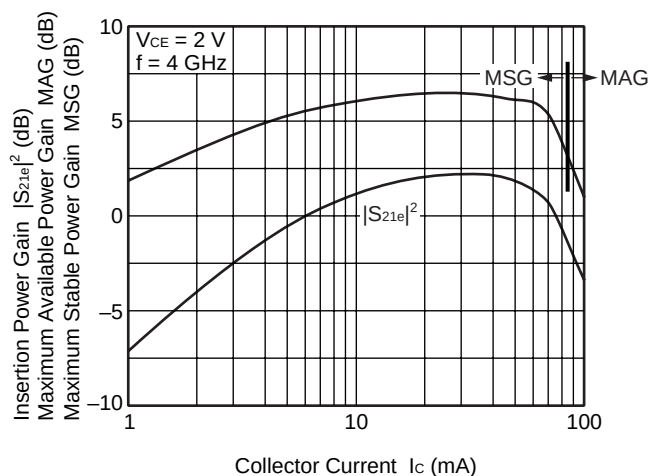
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



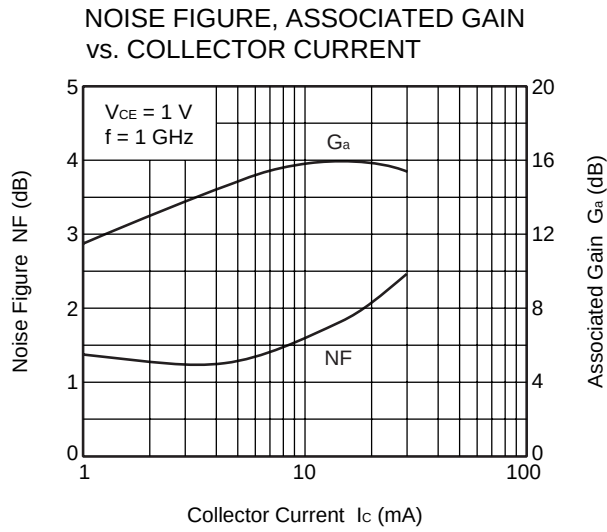
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



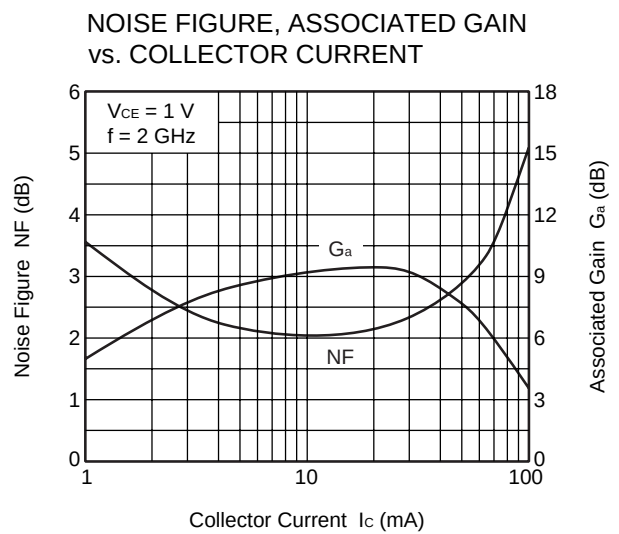
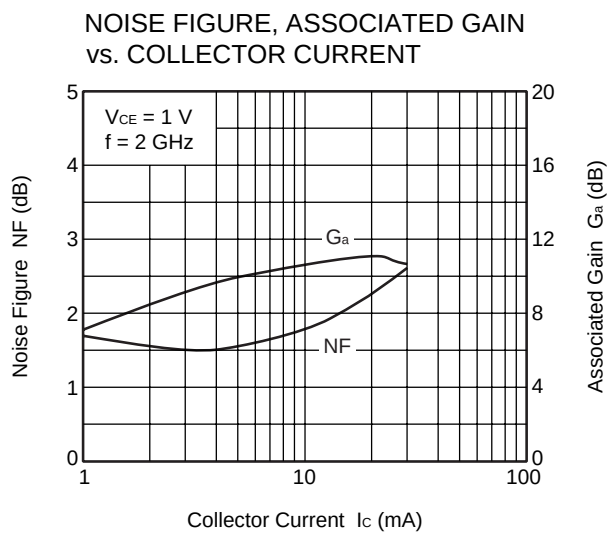
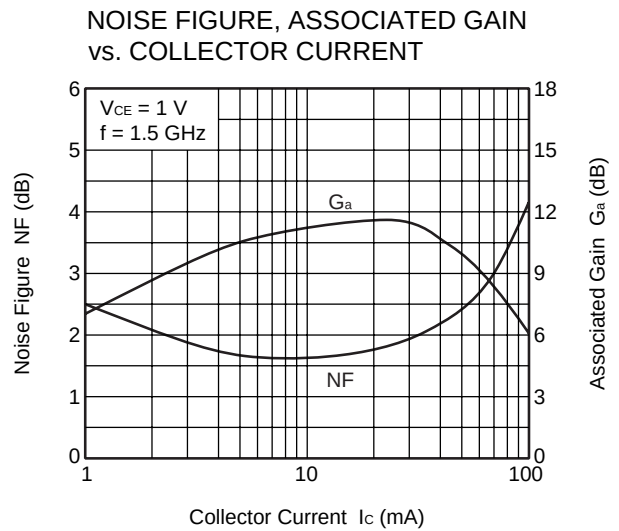
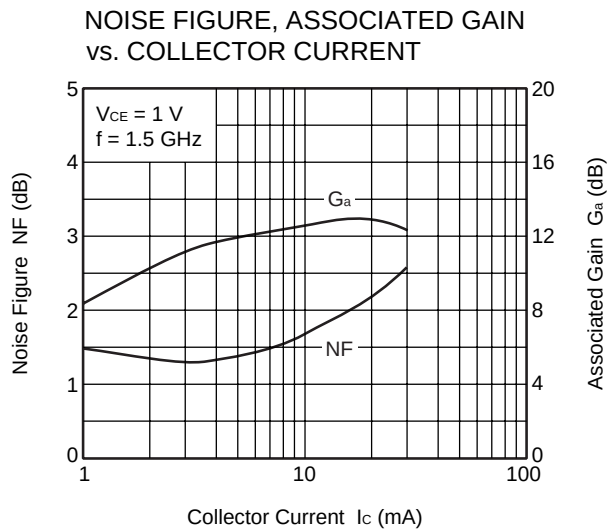
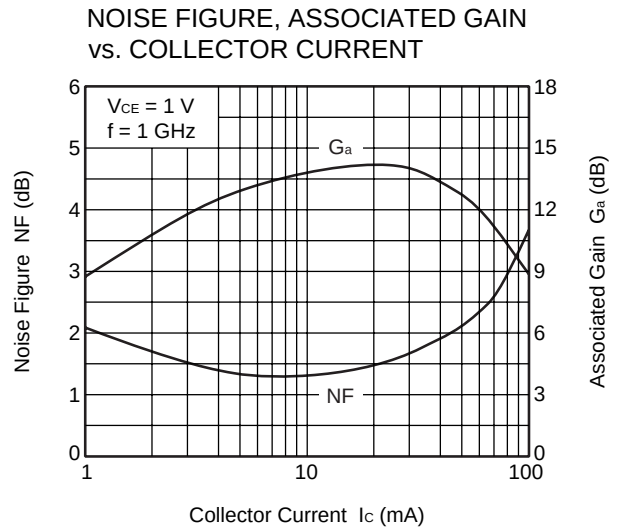
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



Q1

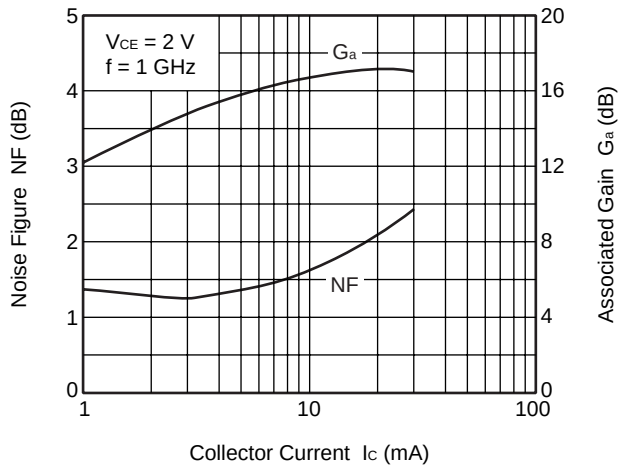


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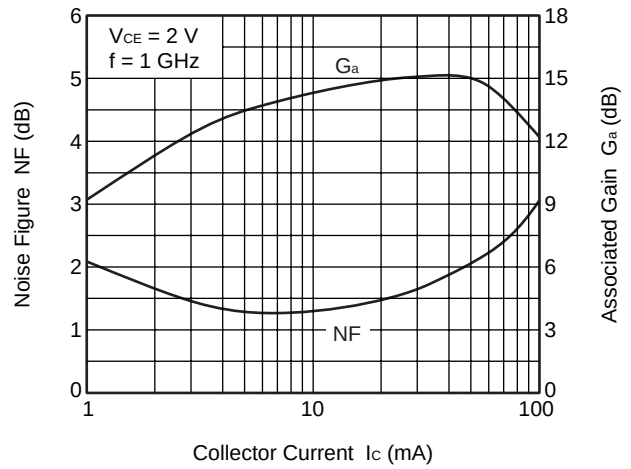
Q1

NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT

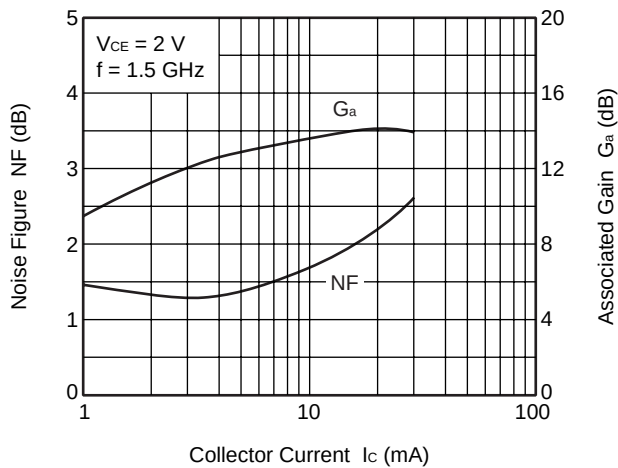


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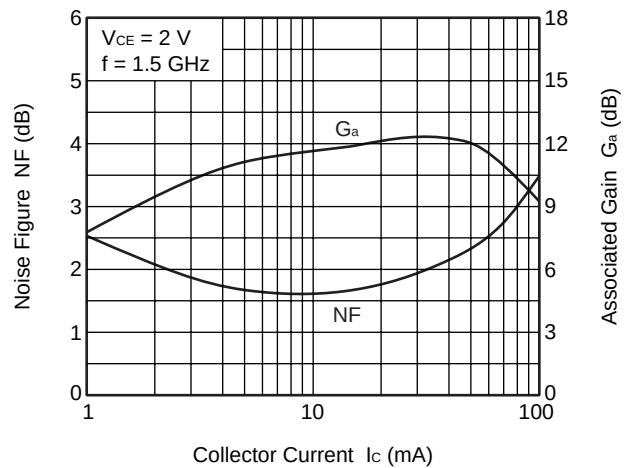
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



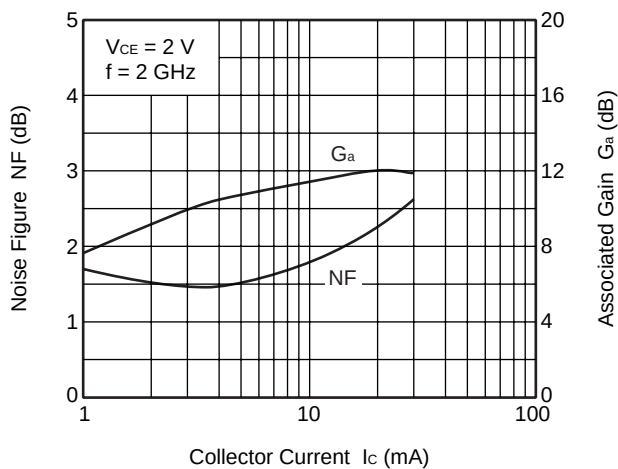
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



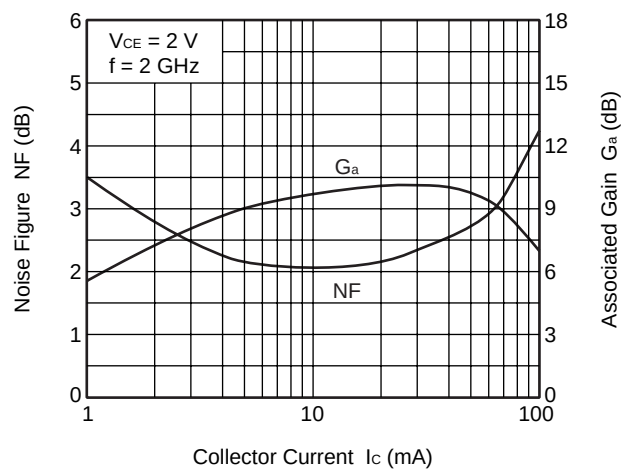
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.