NEC

NPN SILICON RF TRANSISTOR
NE661M05

NPN SILICON RF TRANSISTOR FOR LOW CURRENT, LOW-NOISE, HIGH-GAIN AMPLIFICATION FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M05)

FEATURES

- Low noise and high gain with low collector current
  NF = 1.2 dB TYP. @ V_{CE} = 2 V, I_C = 2 mA, f = 2 GHz
- Maximum stable power gain : MSG = 22.0 dB TYP. @ V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz
- f_T = 25 GHz technology
- Flat-lead 4-pin thin-type super minimold (M05) package

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE661M05	50 pcs (Non reel)	• 8 mm wide embossed taping
NE661M05-T1	3 kpcs/reel	• Pin 3 (Collector), Pin 4 (Emitter) face the perforation side of the tape

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

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	12	mA
Total Power Dissipation	P_{tot} Note	39	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 PCB

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.

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The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	V_{CB} = 5 V, I_E = 0 mA	–	–	100	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 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	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 10 mA, f = 2 GHz	20.0	25.0	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz	14.0	17.0	–	dB
Noise Figure	NF	V_{CE} = 2 V, I_C = 2 mA, f = 2 GHz, $Z_S = Z_{opt}$	–	1.2	1.5	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 2 V, I_E = 0 mA, f = 1 MHz	–	0.08	0.12	pF
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz	–	22.0	–	dB
Gain 1 dB Compression Output power	$P_{O\ (1\ dB)}$	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz	–	5.0	–	dBm
3rd Order Intermodulation Distortion Output Intercept Point	OIP_3	V_{CB} = 2 V, I_C = 5 mA, f = 2 GHz	–	15.0	–	dBm

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

2. Collector to base capacitance when the emitter grounded

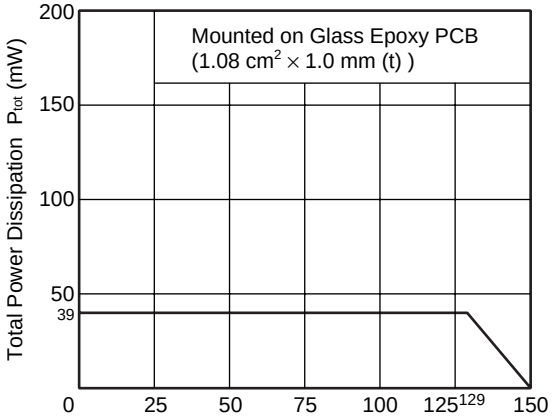
3. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

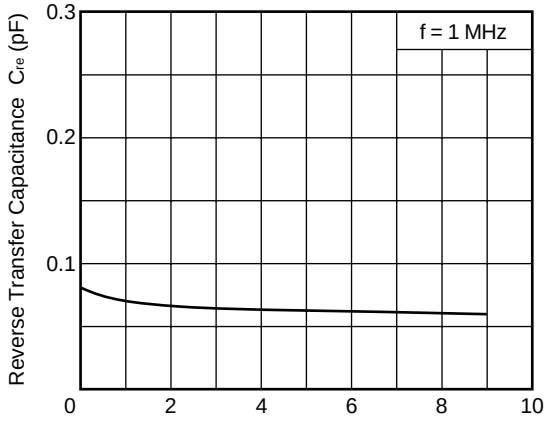
Rank	FB
Marking	T81
h_{FE} Value	50 to 100

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

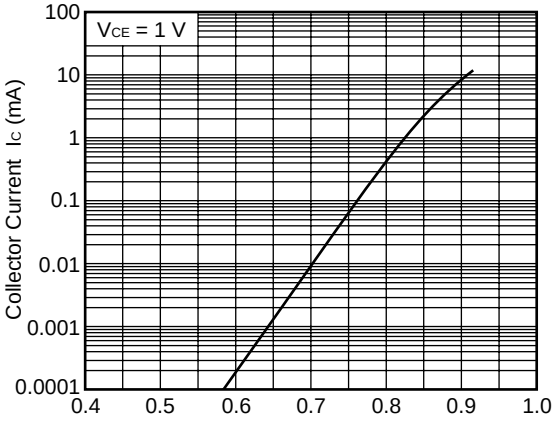
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



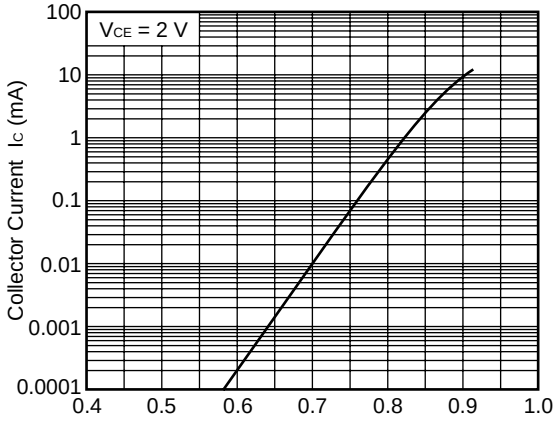
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



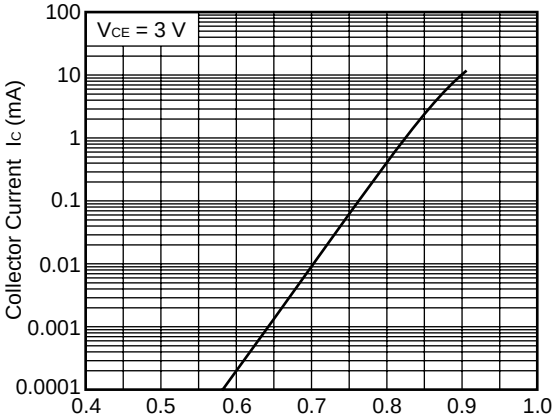
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



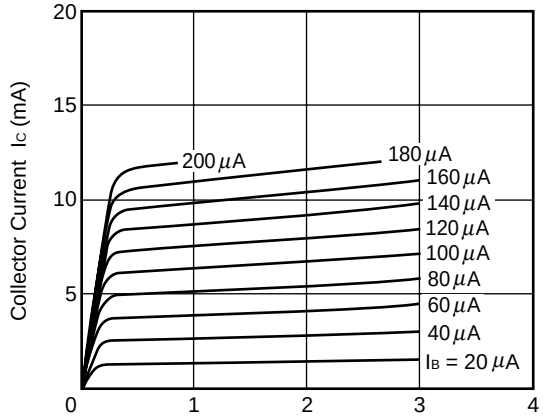
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



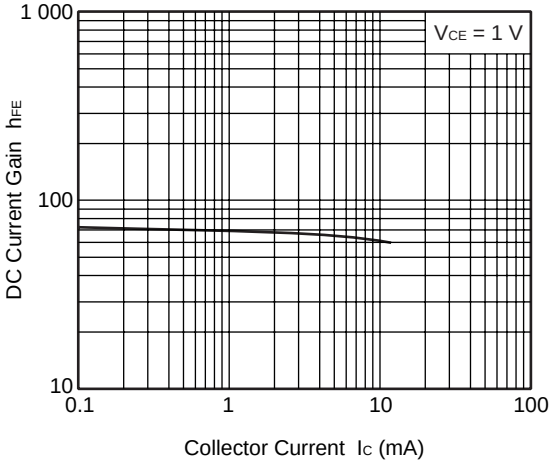
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



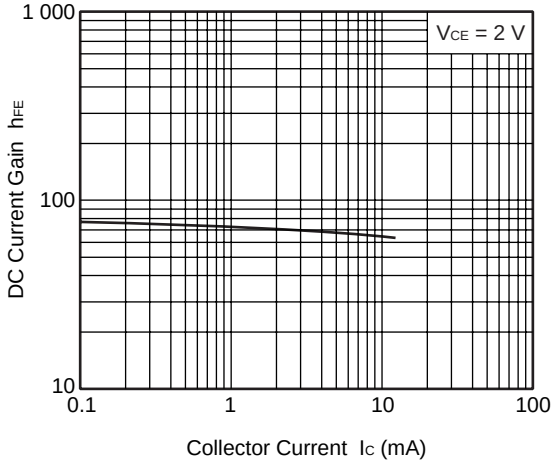
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



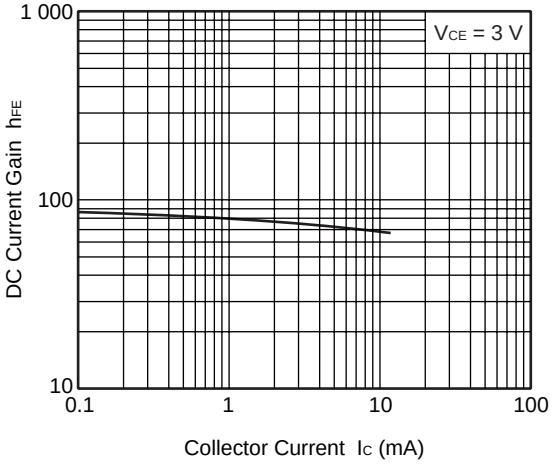
DC CURRENT GAIN vs.
COLLECTOR CURRENT



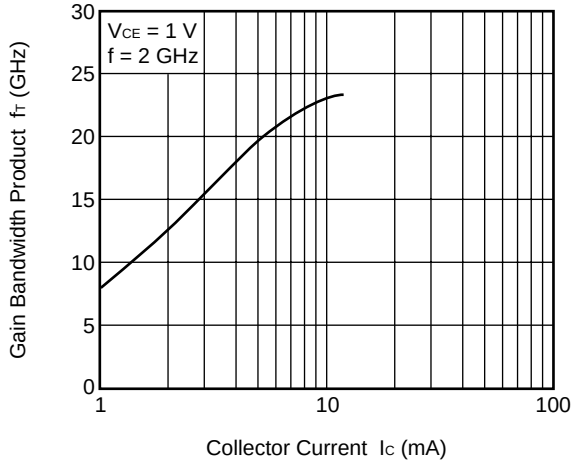
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
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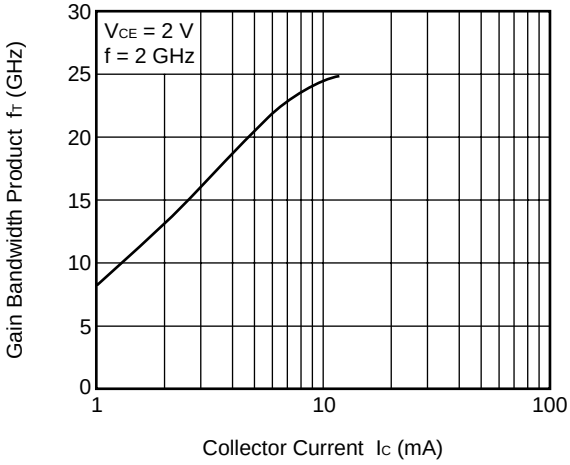

GAIN BANDWIDTH PRODUCT
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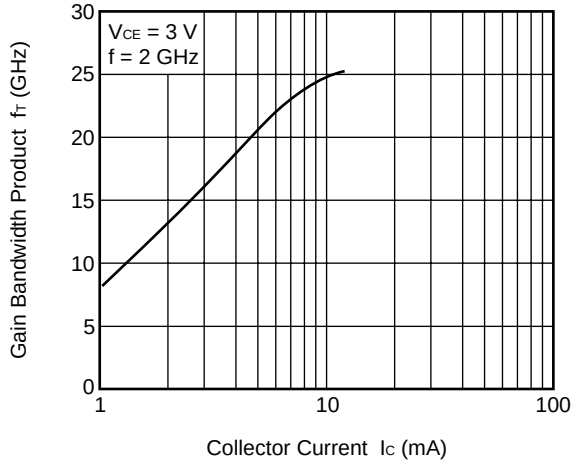
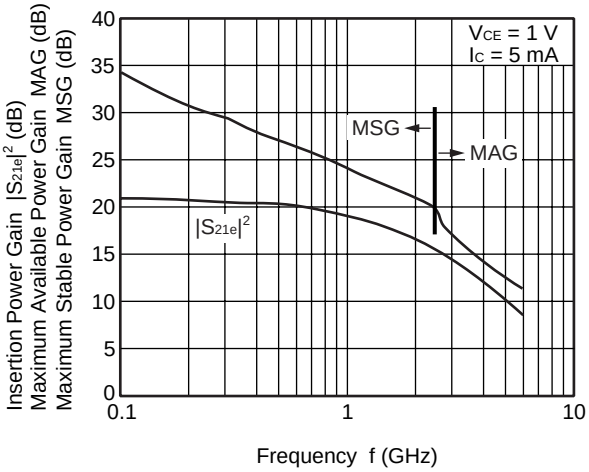


INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



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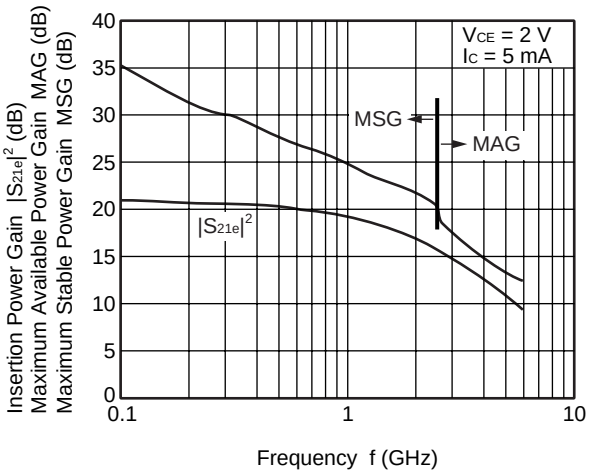

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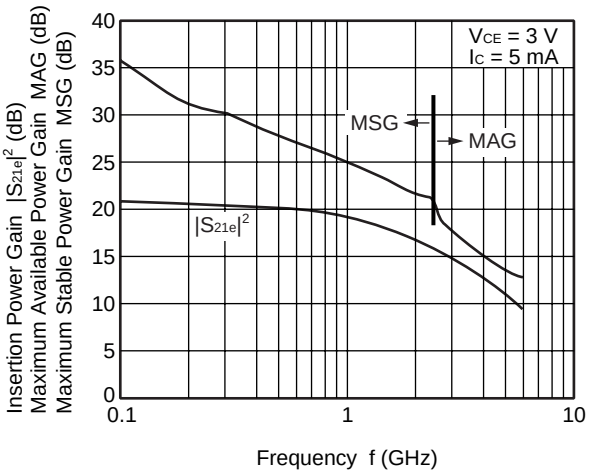
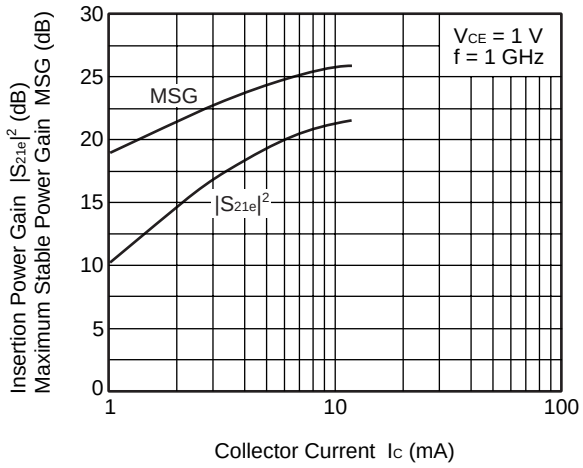


INSERTION POWER GAIN, MSG
vs. COLLECTOR CURRENT



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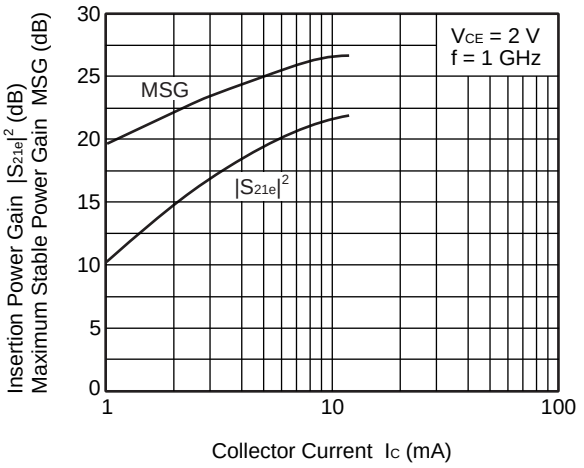

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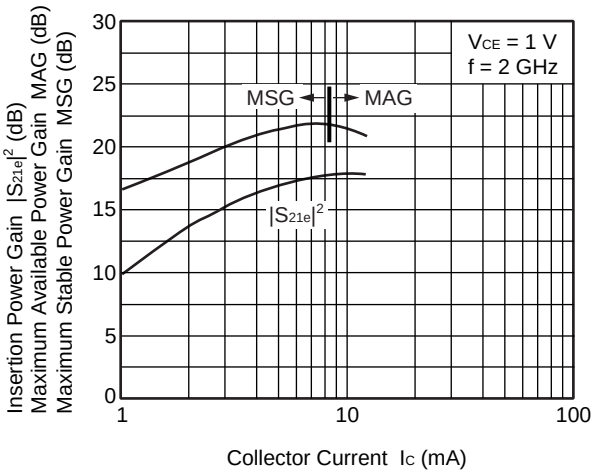

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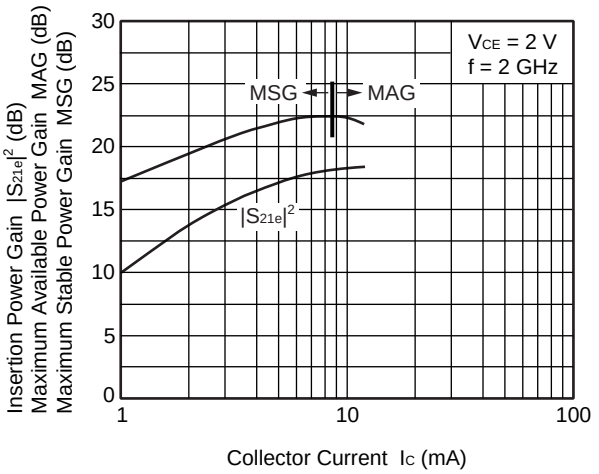

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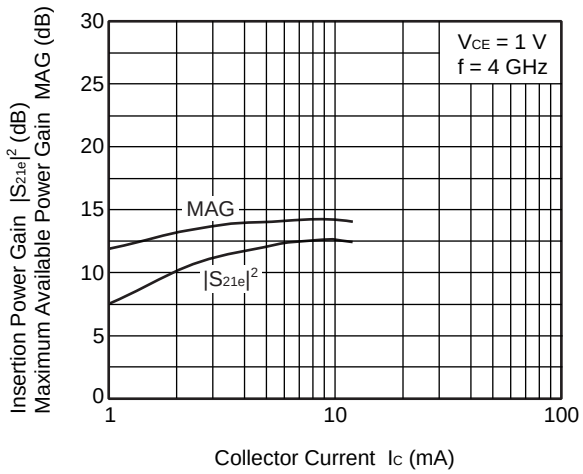

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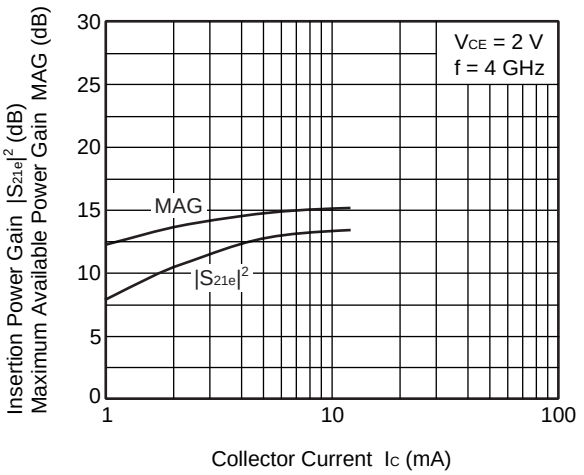

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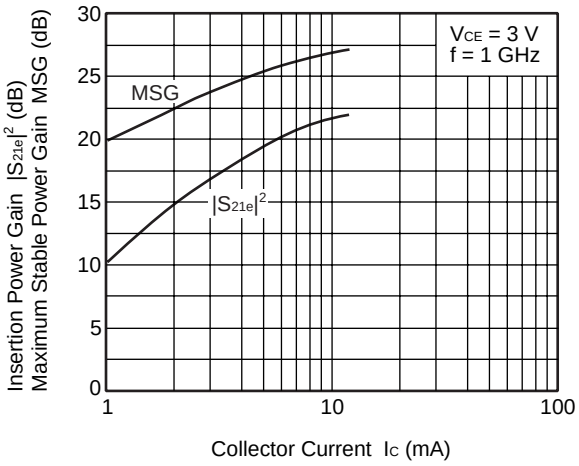

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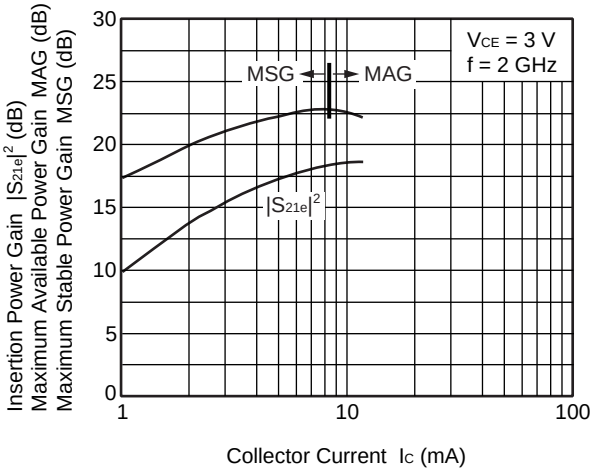

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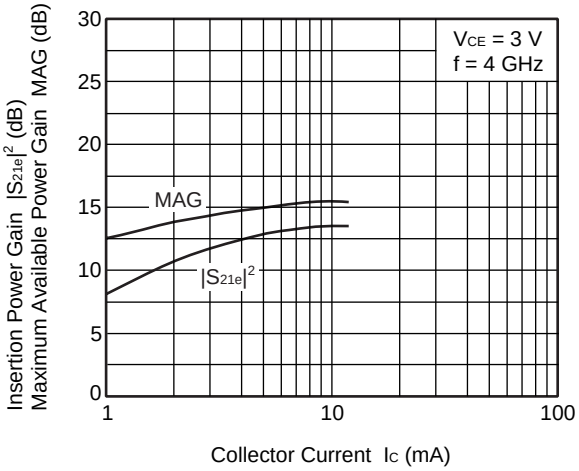
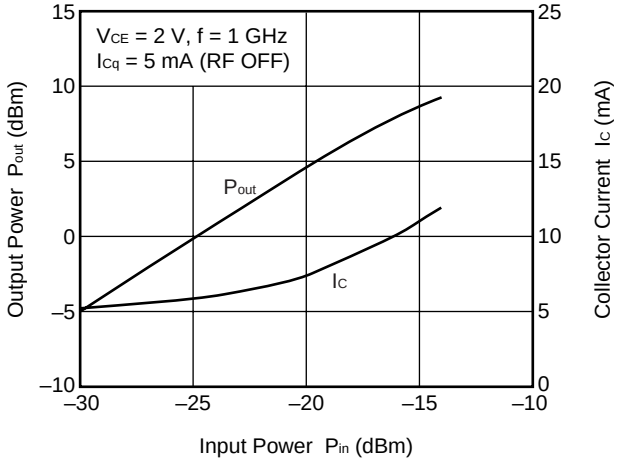


OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



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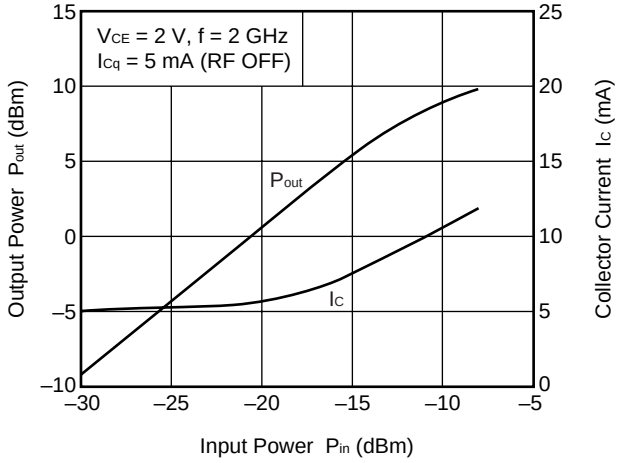
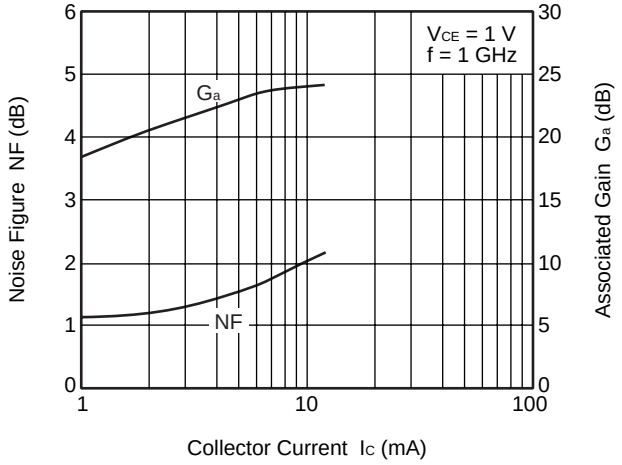


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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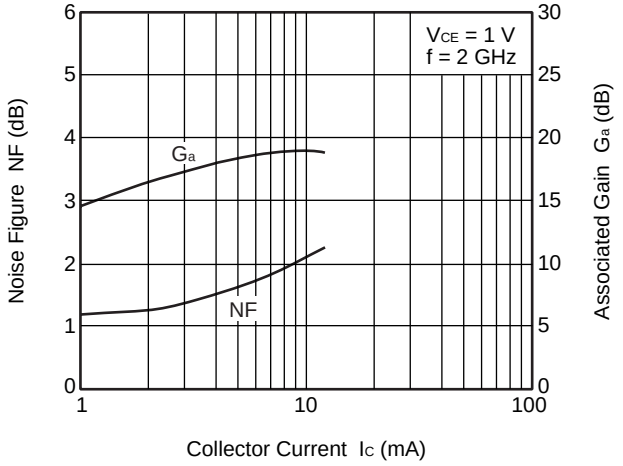
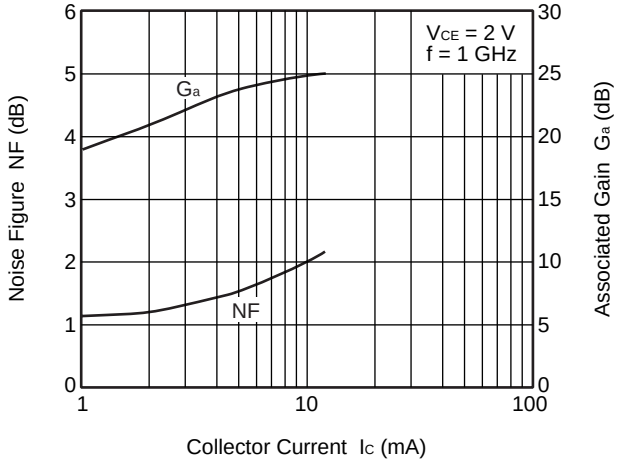


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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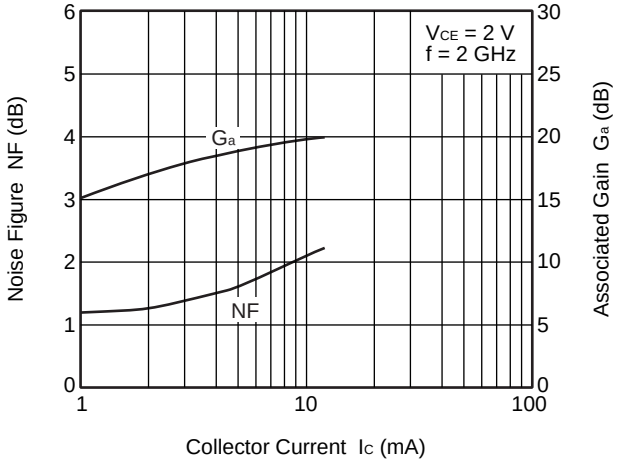

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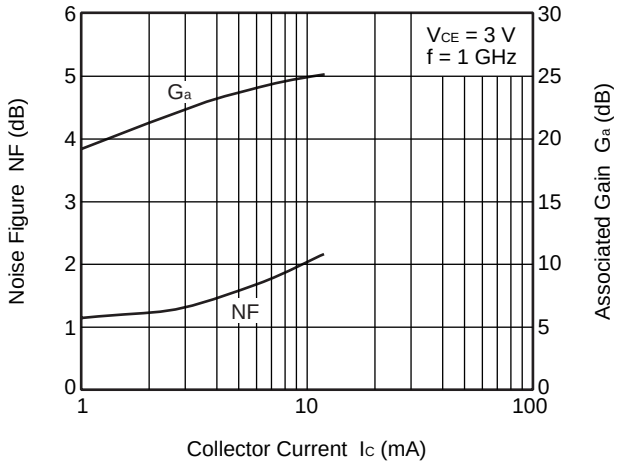
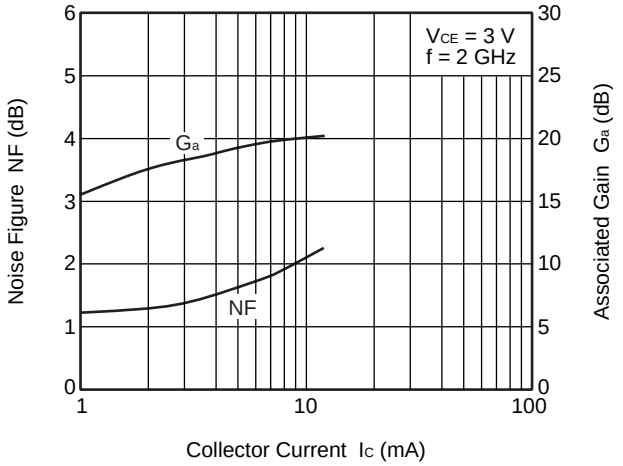


NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

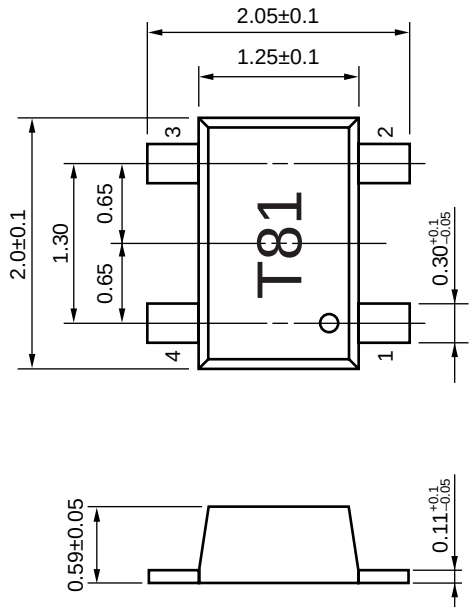
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL http://www.csd-nec.com/

PACKAGE DIMENSIONS

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M05) (UNIT: mm)



PIN CONNECTIONS

1. Base
2. Emitter
3. Collector
4. Emitter

- **The information in this document is current as of May, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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M8E 00.4-0110

▶**For further information, please contact**

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