NESG7030M04

NPN Silicon Germanium Carbon RF Transistor

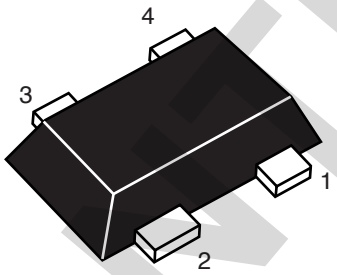
Data Sheet
R09DS0037EJ0100
Rev.1.00
Apr 18, 2012

FEATURES

- The device is an ideal choice for low noise, high gain amplification.
  NF = 0.75 dB TYP. @ V_{CE} = 2 V, I_C = 5 mA, f = 5.8 GHz
  G_a = 14 dB TYP. @ V_{CE} = 2 V, I_C = 5 mA, f = 5.8 GHz
- $P_{O\ (1\ dB)}$ = 4.5 dBm TYP. @ V_{CE} = 2 V, $I_{C\ (set)}$ = 10 mA, f = 2 GHz
- Maximum stable power gain: MSG =16.5 dB TYP. @ V_{CE} = 2 V, I_C = 15 mA, f = 5.8 GHz
- SiGe: C HBT technology
- This product is improvement of ESD.
- Flat-lead 4-pin thin-type super minimold (M04 PKG)

OUTLINE

RENESAS Package code : M04
(Package name : Flat-lead 4-pin thin-type super minimold (M04 PKG))



Note : Marking is "T1R."

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

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG7030M04	NESG7030M04-A	Flat-lead 4-pin thin-type super minimold (M04 PKG) (Pb-Free)	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 1(Emitter), Pin 2 (Collector) face the perforation side of the tape
NESG7030M04-T2	NESG7030M04-T2-A		3 kpcs/reel	
NESG7030M04-T2B	NESG7030M04-T2B-A		15kpcs/reel	

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

CAUTION

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

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	10	V
Collector to Emitter Voltage	V_{CEO}	4.3	V
Base Current	I_B Note1	2	mA
Collector Current	I_C	30	mA
Total Power Dissipation	P_{tot} Note2	125	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Notes: 1. Depend on the ESD protect device.
2. Mounted on 1.08 cm^2 ×1.0 mm (t) glass epoxy PWB

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	V_{CB} = 4.3 V, I_E = 0	–	–	100	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 0.4 V, I_C = 0	–	–	100	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 2 V, I_C = 5 mA	200	320	500	–
RF Characteristics						
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 2 V, I_E = 0, f = 1 MHz	–	50	80	fF
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 2 V, I_C = 15 mA, f = 5.8 GHz	11.0	13.0	–	dB
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 2 V, I_C = 15 mA, f = 5.8 GHz	–	16.5	–	dB
Noise Figure (1)	NF1	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	0. 5	–	dB
Associated Gain (1)	G_{a1}	V_{CE} = 2 V, I_C = 5 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	21.0	–	dB
Noise Figure (2)	NF2	V_{CE} = 2 V, I_C = 5 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	0.75	1.15	dB
Associated Gain (2)	G_{a2}	V_{CE} = 2 V, I_C = 5 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	12.0	14.0	–	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 2 V, $I_{C\ (set)}$ = 10 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	4.5	–	dBm

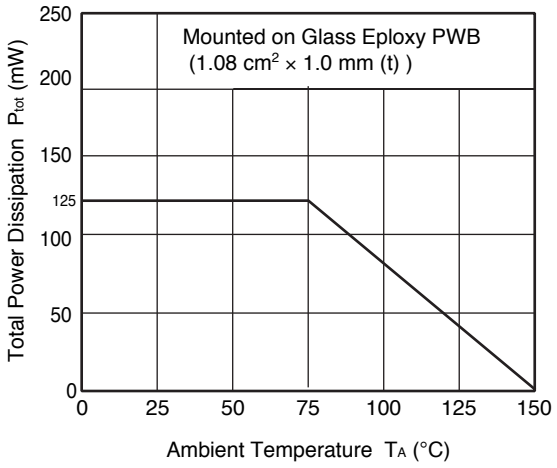
Notes: 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
2. Collector to base capacitance when the emitter grounded.
3. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

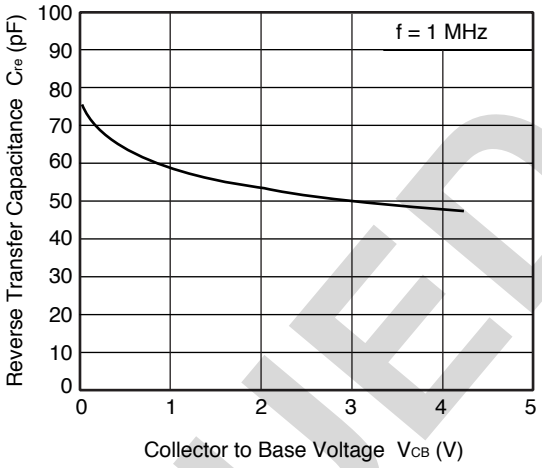
Rank	YFB
Marking	T1R
h_{FE} Value	200 to 500

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

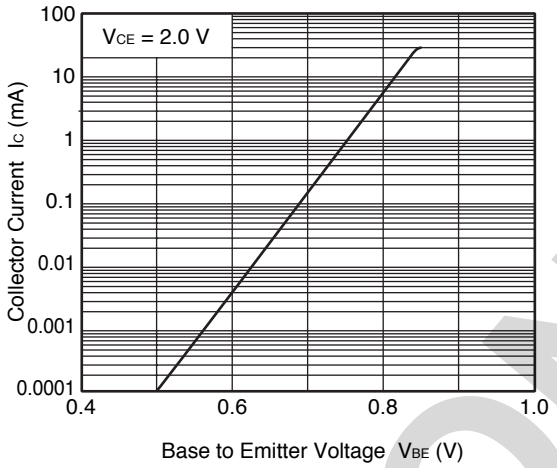
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



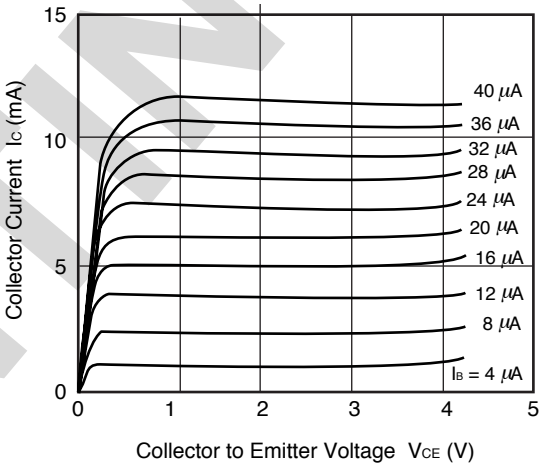
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



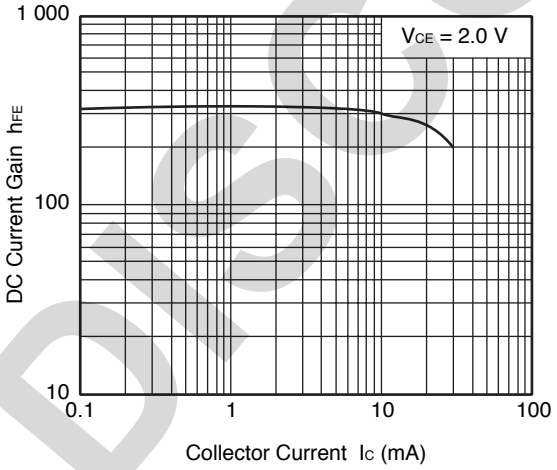
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

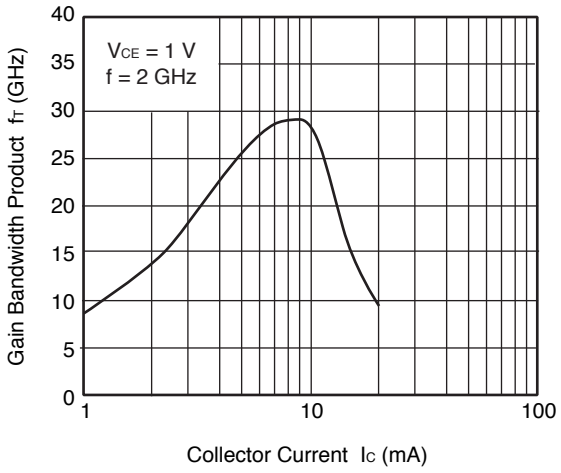


DC CURRENT GAIN vs. COLLECTOR CURRENT

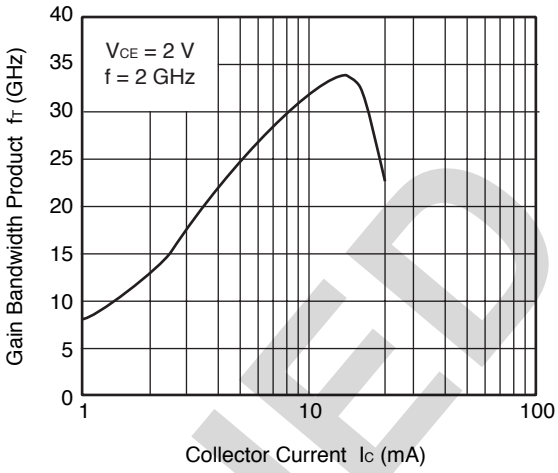


Remark The graph indicates nominal characteristics.

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
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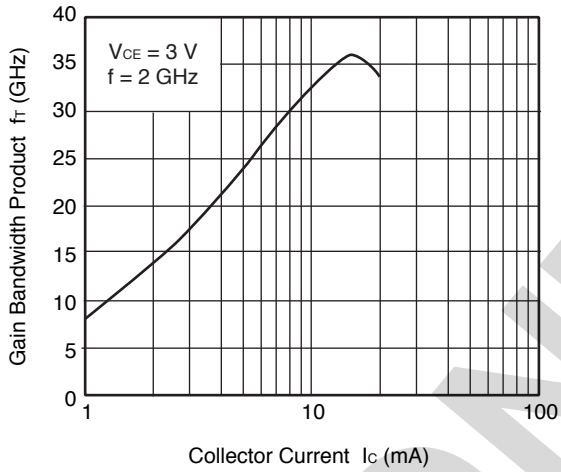
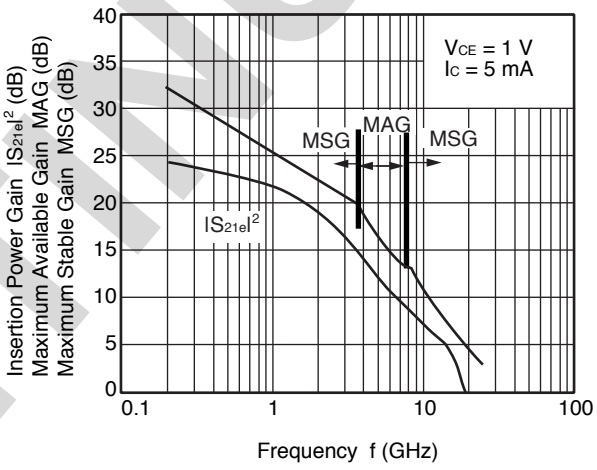
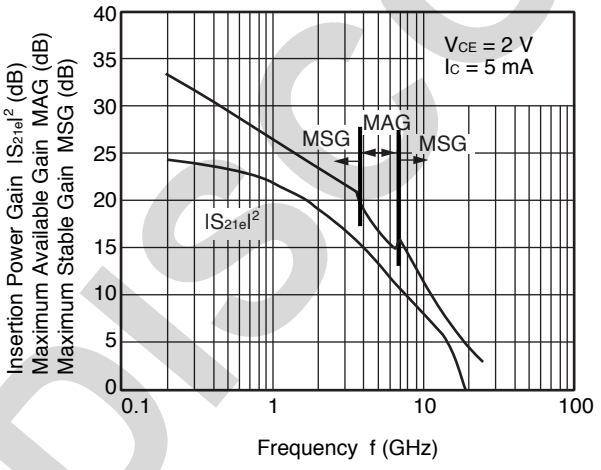


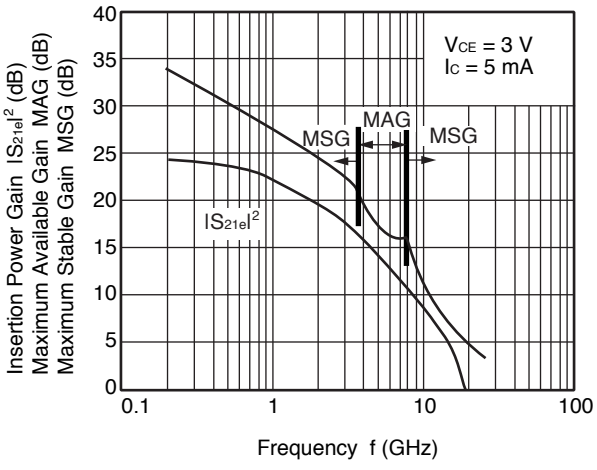
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



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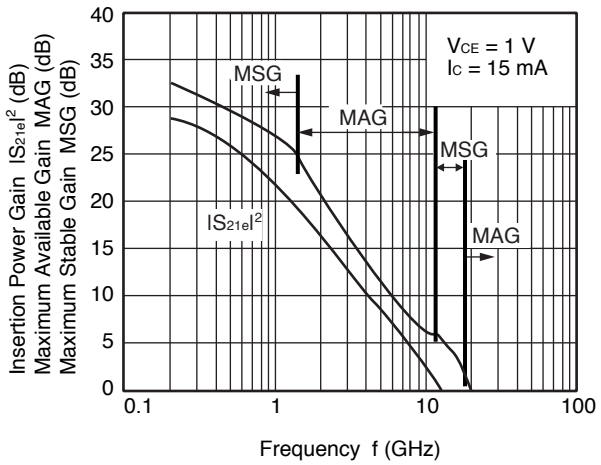
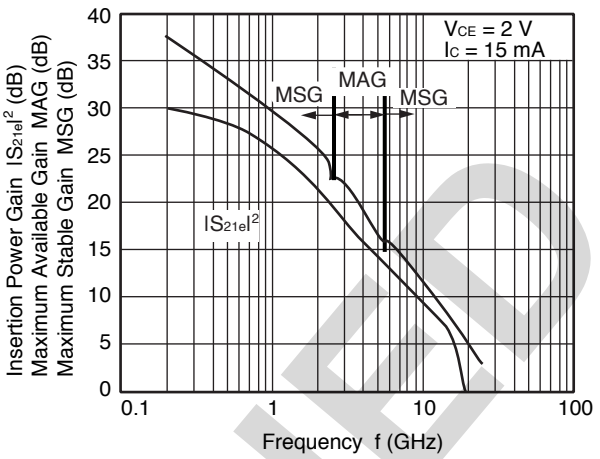
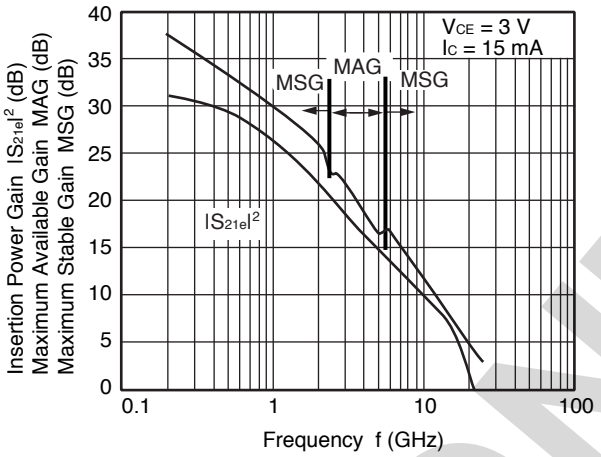
INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY

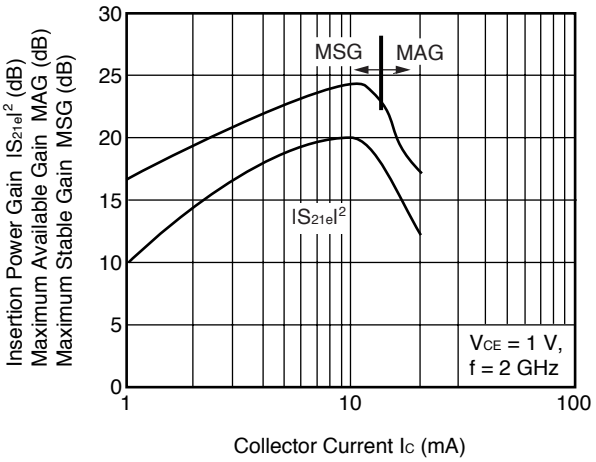


INSERTION POWER GAIN,
MAG, MSG vs. FREQUENCY

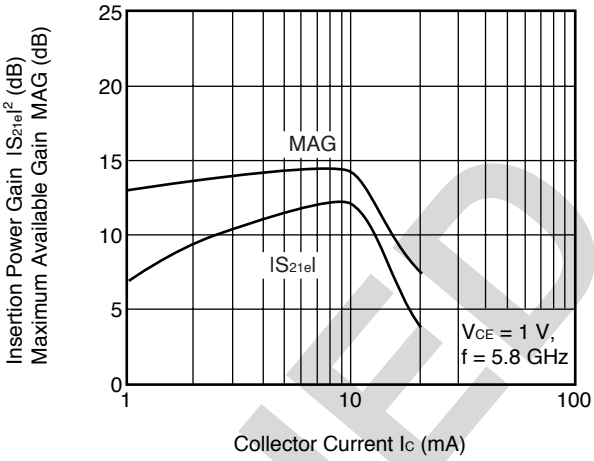


Remark The graph indicates nominal characteristics.

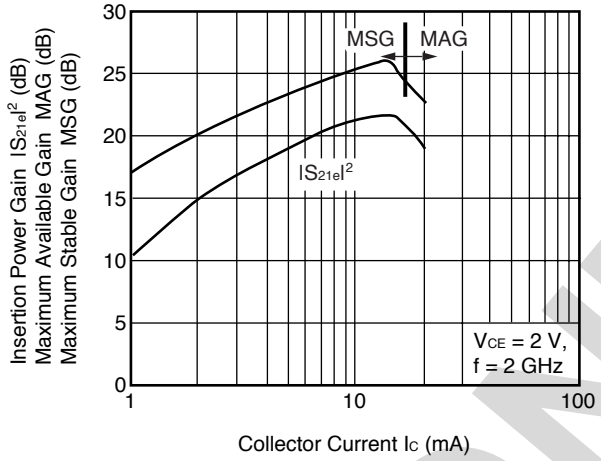
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



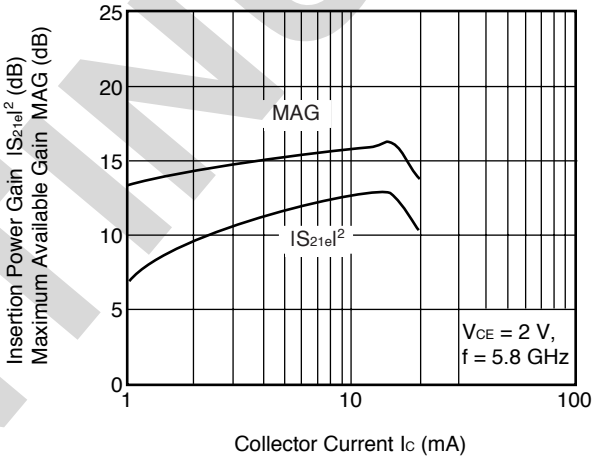
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



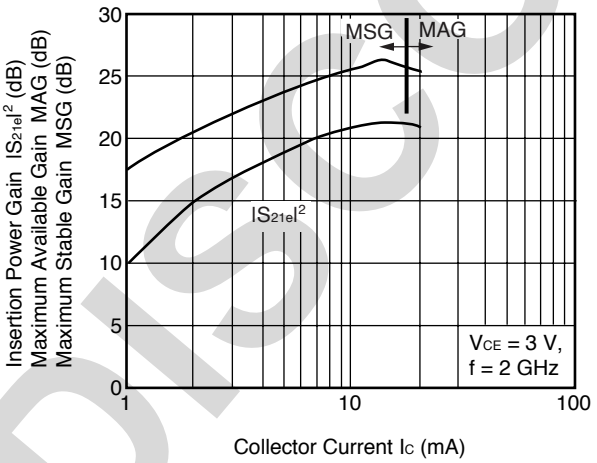
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



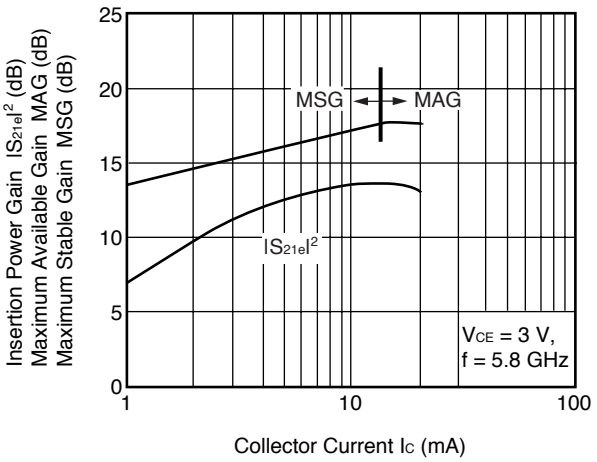
INSERTION POWER GAIN, MAG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

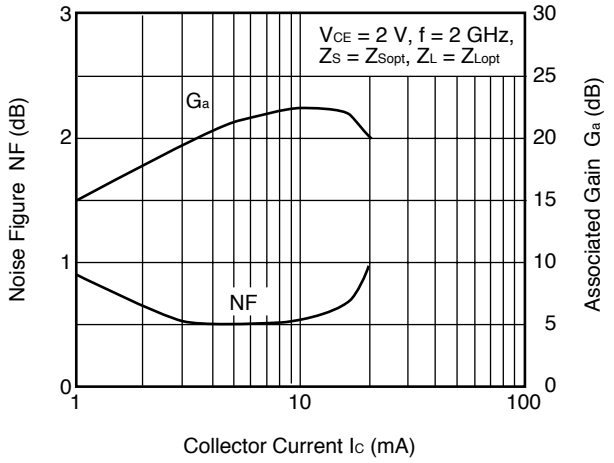


INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

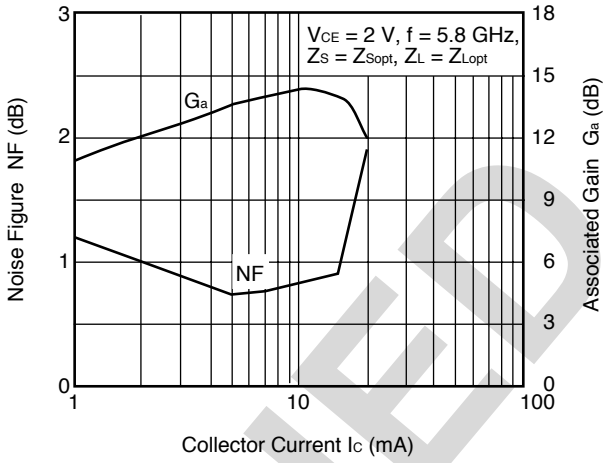


Remark The graph indicates nominal characteristics.

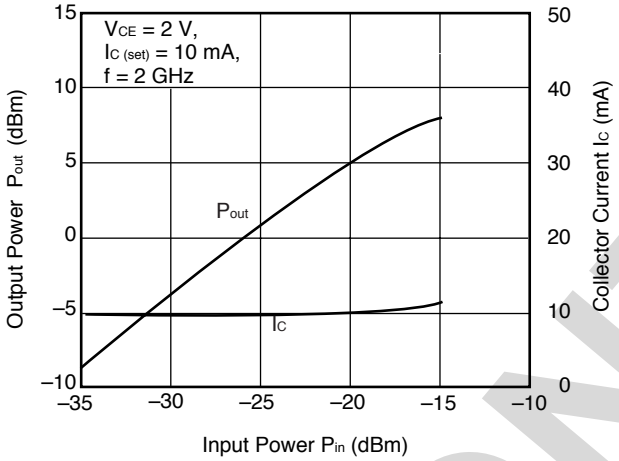
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



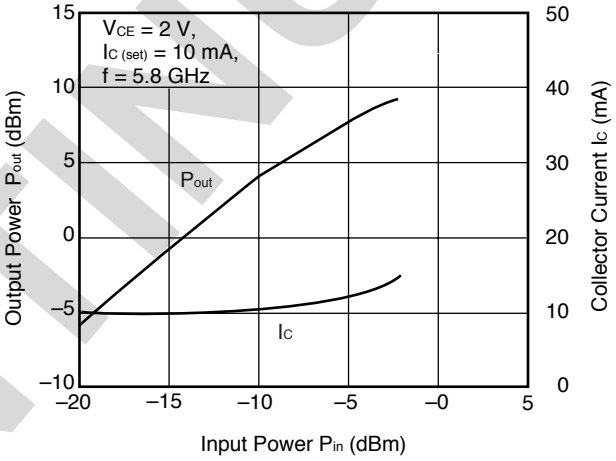
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



OUTPUT POWER, COLLECTOR CURRENT vs. INPUT POWER



Remark The graph indicates nominal characteristics.

S-PARAMETERS

S-parameters and noise parameters are provided on our web site in a form (S2P) that enables direct import to microwave circuit simulators without keyboard inputs.

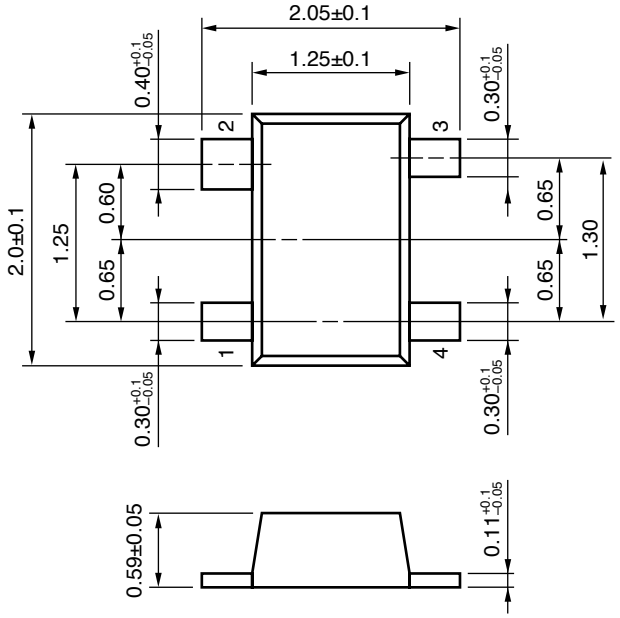
Click here to download S-parameters.

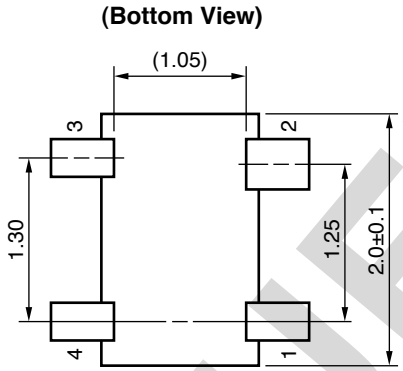
[Products] → [RF Devices] → [Device Parameters]

URL http://www.renesas.com/products/microwave/download/parameter/

PACKAGE DIMENSIONS

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M04 PKG) (UNIT: mm)





PIN CONNECTIONS

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

Revision History	NESG7030M04 Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	Apr 18, 2012	–	First edition issued