

NPN SILICON GERMANIUM RF TRANSISTOR NESG2101M05

NPN SiGE RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (125 mW) FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M05)

FEATURES

• The device is an ideal choice for medium output power, high-gain amplification and low distortion, low noise, high-gain amplification

Po (1 dB) = 21 dBm TYP. @ VcE = 3.6 V, Icq = 10 mA, f = 2 GHz NF = 0.6 dB TYP., Ga = 19.0 dB TYP. @ VcE = 2 V, Ic = 7 mA, f = 1 GHz

- Maximum stable power gain: MSG = 17.0 dB TYP. @ VcE = 3 V, Ic = 50 mA, f = 2 GHz
- High breakdown voltage technology for SiGe Tr. adopted: VoEo (absolute maximum ratings) = 5.0 V
- Flat-lead 4-pin thin-type super minimold (M05) package

ORDERING INFORMATION

Part Number	Quantity	Supplying Form	
NESG2101M05-A	50 pcs (Non reel)	8 mm wide embossed taping	
NESG2101M05-T1-A	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	Vсво	13.0	V
Collector to Emitter Voltage	VCEO	5.0	V
Emitter to Base Voltage	VEBO	1.5	V
Collector Current	lc	100	mA
Total Power Dissipation	P _{tot} Note	500	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to +150	°C

Note Mounted on 38×38 mm, t = 0.4 mm polyimide 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.

ELECTRICAL CHARACTERISTICS (TA = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit		
DC Characteristics								
Collector Cut-off Current	Ісво	VcB = 5 V, IE = 0 mA	-	-	100	nA		
Emitter Cut-off Current	ІЕВО	VEB = 1 V, Ic = 0 mA	_	_	100	nA		
DC Current Gain	hfe Note 1	Vce = 2 V, Ic = 15 mA	130	190	260	=		
RF Characteristics								
Gain Bandwidth Product	f⊤	Vce = 3 V, Ic = 50 mA, f = 2 GHz	14	17	-	GHz		
Insertion Power Gain	S _{21e} ²	Vce = 3 V, Ic = 50 mA, f = 2 GHz	11.5	13.5	-	dB		
Noise Figure (1)	NF	$\label{eq:Vce} \begin{split} &\text{Vce} = 2 \text{ V, Ic} = 10 \text{ mA, f} = 2 \text{ GHz,} \\ &\text{Zs} = Z_{\text{Sopt}}, \text{ ZL} = Z_{\text{Lopt}} \end{split}$	_	0.9	1.2	dB		
Noise Figure (2)	NF	$\label{eq:Vce} \begin{split} &\text{Vce} = 2 \text{ V, Ic} = 7 \text{ mA, f} = 1 \text{ GHz,} \\ &\text{Zs} = Z_{\text{Sopt}}, Z_{\text{L}} = Z_{\text{Lopt}} \end{split}$	_	0.6	-	dB		
Associated Gain (1)	Ga	$\label{eq:Vce} \begin{split} &\text{Vce} = 2 \text{ V, Ic} = 10 \text{ mA, f} = 2 \text{ GHz,} \\ &\text{Zs} = Z_{\text{Sopt}}, \text{ ZL} = Z_{\text{Lopt}} \end{split}$	11.0	13.0	-	dB		
Associated Gain (2)	Ga	$V_{CE} = 2 \text{ V, Ic} = 7 \text{ mA, f} = 1 \text{ GHz,}$ $Z_{S} = Z_{Sopt}, Z_{L} = Z_{Lopt}$	-	19.0	-	dB		
Reverse Transfer Capacitance	Cre Note 2	VcB = 2 V, IE = 0 mA, f = 1 MHz	=	0.4	0.5	pF		
Maximum Stable Power Gain	MSG Note	Vce = 3 V, Ic = 50 mA, f = 2 GHz	14.5	17.0	-	dB		
Gain 1 dB Compression Output Power	Po (1 dB)	Vce = 3.6 V, Icq = 10 mA, f = 2 GHz	-	21	=	dBm		
Linear Gain	G∟	Vce = 3.6 V, Icq = 10 mA, f = 2 GHz	-	15	-	dB		

Notes 1. Pulse measurement: PW \leq 350 μ s, Duty Cycle \leq 2%

2. Collector to base capacitance when the emitter grounded

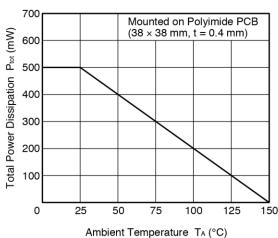
3. MSG =
$$\frac{S_{21}}{S_{12}}$$

hfe CLASSIFICATION

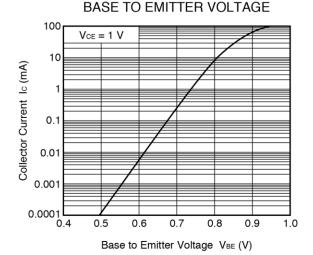
Rank	FB		
Marking	T1J		
h _{FE} Value	130 to 260		

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

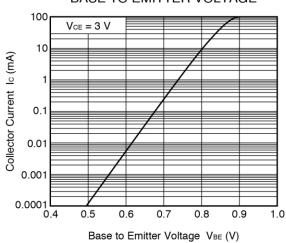




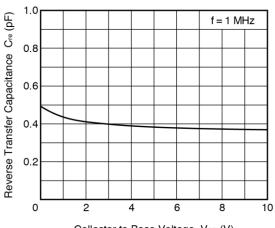
COLLECTOR CURRENT vs.



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

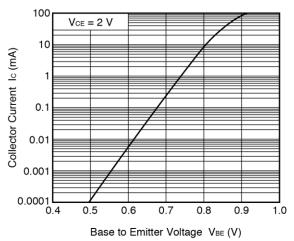


REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE

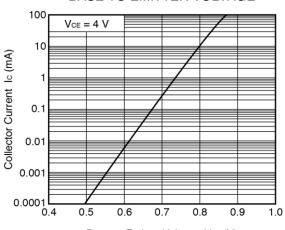


Collector to Base Voltage VcB (V)

COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

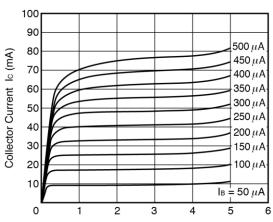


COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



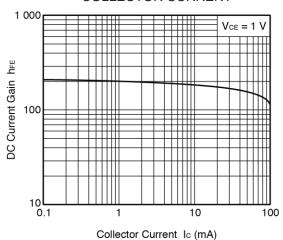
Base to Emitter Voltage VBE (V)

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

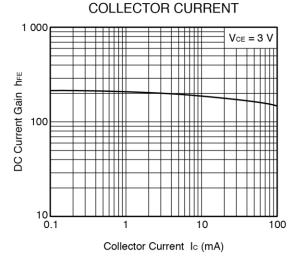


Collector to Emitter Voltage VcE (V)

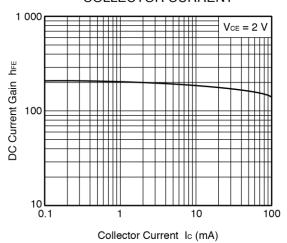
DC CURRENT GAIN vs. COLLECTOR CURRENT



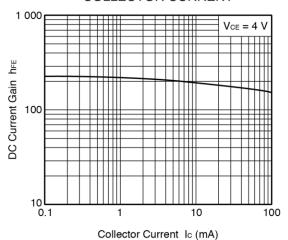
DC CURRENT GAIN vs.



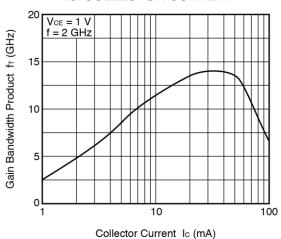
DC CURRENT GAIN vs. COLLECTOR CURRENT



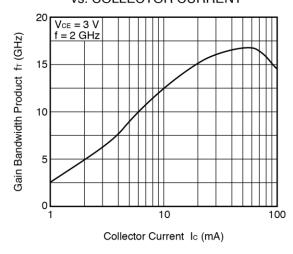
DC CURRENT GAIN vs. COLLECTOR CURRENT



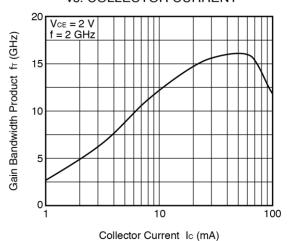
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



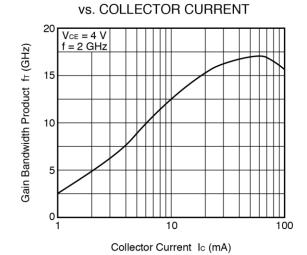
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

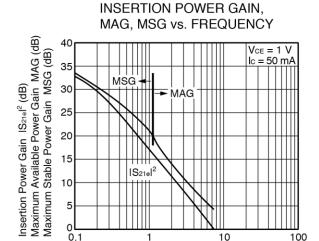


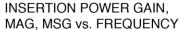
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



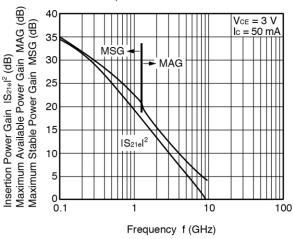
GAIN BANDWIDTH PRODUCT



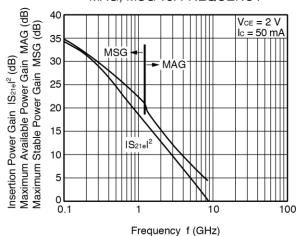




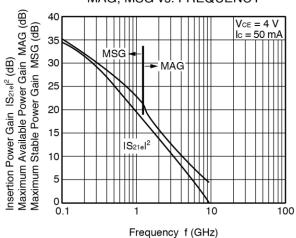
Frequency f (GHz)



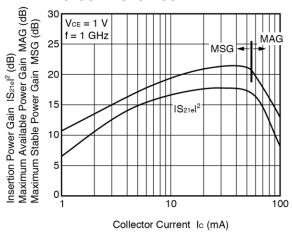
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



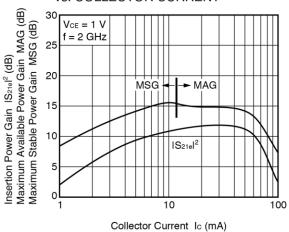
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



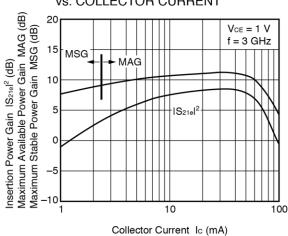
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



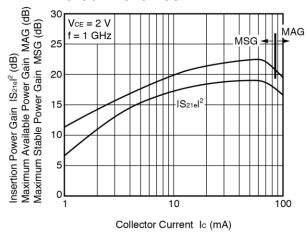
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



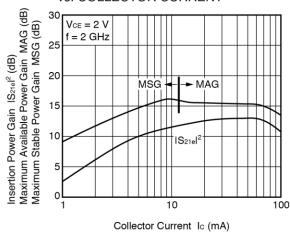
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



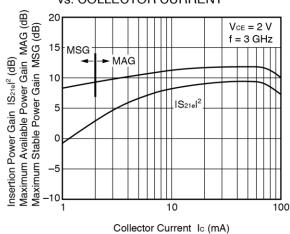
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



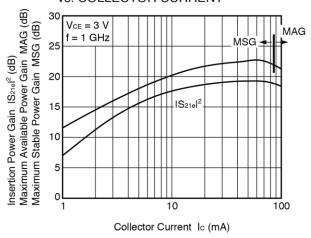
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



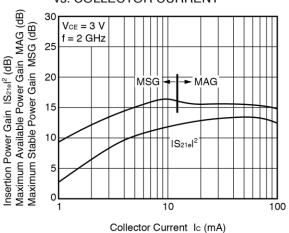
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



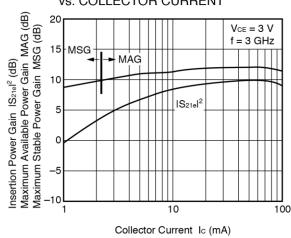
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



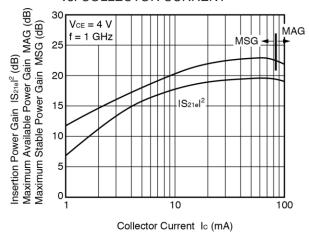
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



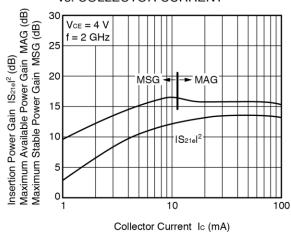
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



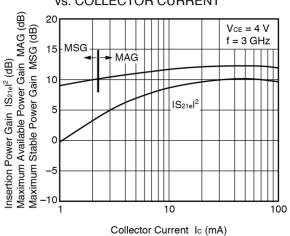
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

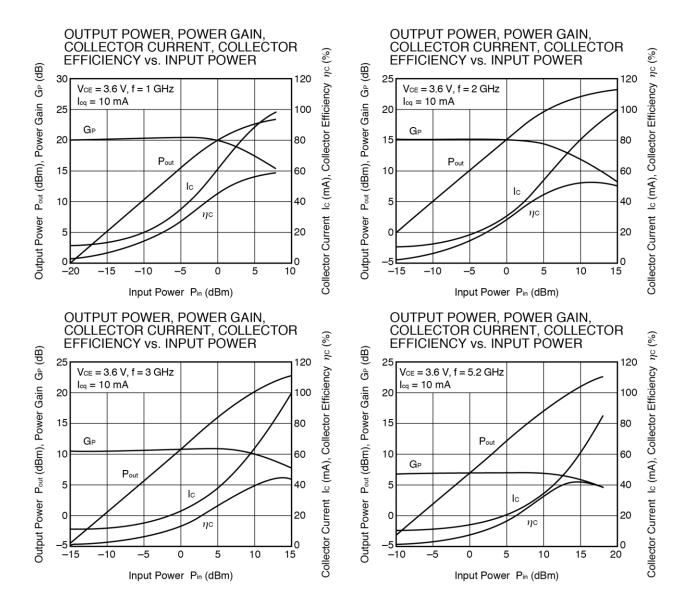


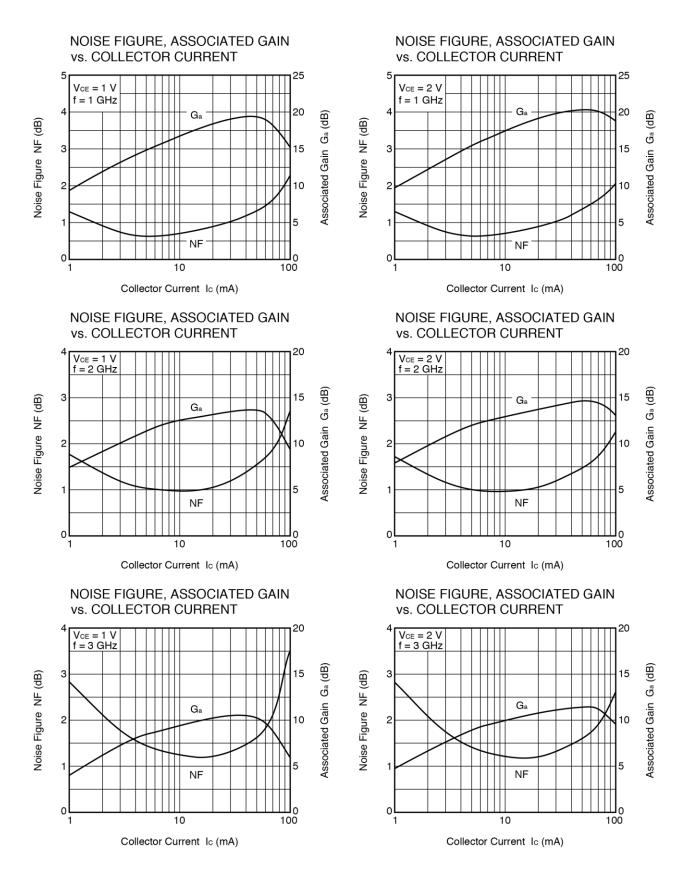
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

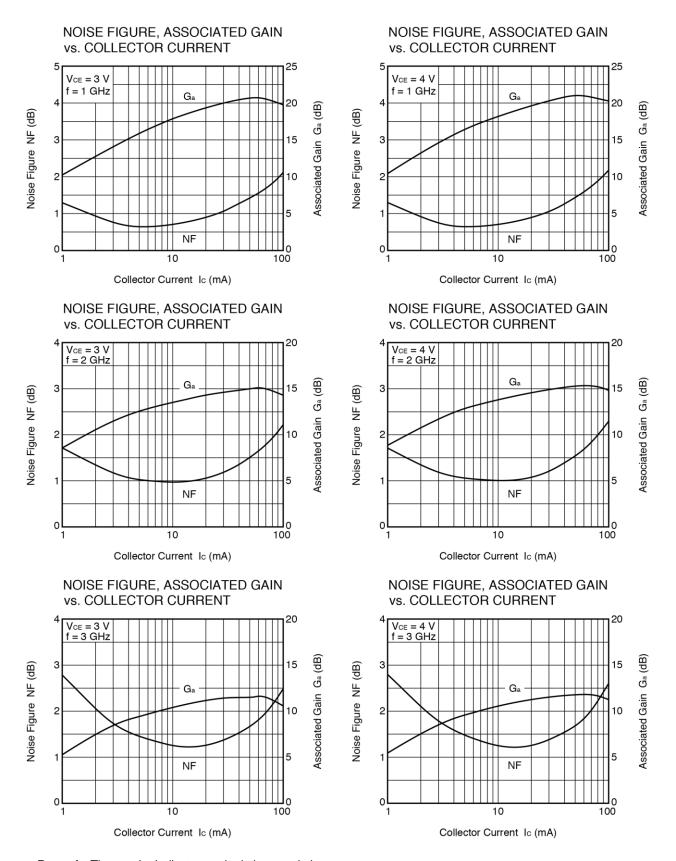


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT









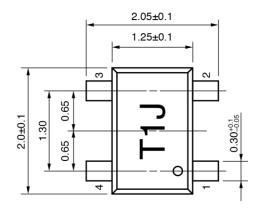
Remark The graphs indicate nominal characteristics.

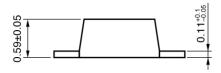
S-PARAMETERS

- S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.
- · Click here to download S-parameters.
- [RF and Microwave] ® [Device Parameters]
- URL http://www.necel.com/microwave/en/

PACKAGE DIMENSIONS

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





PIN CONNECTIONS

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