

NPN SILICON GERMANIUM C RF TRANSISTOR NESG4030M14

NPN SiGe:C RF TRANSISTOR FOR LOW NOISE, HIGH-GAIN AMPLIFICATION 4-PIN LEAD-LESS MINIMOLD (M14, 1208 PKG)

FEATURES

- The device is an ideal choice for low noise, high-gain amplification
 NF = 1.1 dB TYP., Ga = 11.5 dB TYP. @ VcE = 2 V, Ic = 6 mA, f = 5.8 GHz
- Maximum stable power gain: MSG = 15 dB TYP. @ VcE = 2 V, Ic = 20 mA, f = 5.8 GHz
- · SiGe:C HBT technology (UHS4) adopted
- · Improvement of ESD protection
- 4-pin lead-less minimold (M14, 1208 PKG)

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form		
NESG4030M14	NESG4030M14-A	4-pin lead-less minimold (M14, 1208 PKG)	50 pcs (Non reel)	• 8 mm w ide embossed taping • Pin 1 (Collector), Pin 4 (Emitter) face the		
NESG4030M14-T3	NESG4030M14-T3-A	(Pb-Free)	10 kpcs/reel	perforation side of the tape		

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

ABSOLUTE MAXIMUM RATINGS (TA = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V _{CBO} Note 1	5.0	V
Collector to Emitter Voltage	VCEO	3.0	V
Base Current	l _B Note 1	12	mA
Collector Current	lc	35	mA
Total Pow er Dissipation	Ptot Note 2	105	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−65 to +150	°C

Notes 1. VCBO and IB are limited by the permissible current of the protection element.

2. Mounted on 1.08 cm² × 1.0 mm (t) glass epoxy PWB

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.

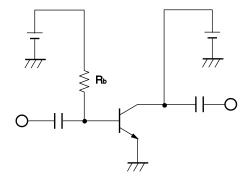
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RECOMMENDED OPERATING RANGE (TA = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	
Input Pow er	Pin	-	-	3	dBm	
Base Feedback Resister	R₀	_	-	150	kΩ	

Remark When the voltage return bias circuit like the figure below is used, a current increase is seen because the ESD protection element is turned on when recommended range of motion in the above table is exceeded.

However, there is no influence of reliability, including deterioration.



ELECTRICAL CHARACTERISTICS (TA = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	Ісво	VcB = 4.3 V,	_	_	100	nA
Emitter Cut-off Current	Ево	$V_{EB} = 0.4 \text{ V}, \text{ lc} = 0 \text{ mA}$	-	1	100	nA
DC Current Gain	hre Note 1	VcE = 2 V, lc = 6 mA	270	400	540	-
RF Characteristics						
Insertion Pow er Gain	S _{21e} ²	VcE = 2 V, lc = 20 mA, f = 5.8 GHz	8.5	10.5	-	dB
Noise Figure	NF	$\label{eq:Vce} \begin{array}{l} \text{Vce} = 2 \; \text{V}, \; \text{lc} = 6 \; \text{mA}, \; \text{f} = 5.8 \; \text{GHz}, \\ \text{Zs} = \text{Zsopt}, \; \text{ZL} = \text{ZLopt} \end{array}$	-	1.1	1.5	dB
Associated Gain	Ga	$\label{eq:Vce} \begin{array}{l} \text{Vce} = 2 \; \text{V}, \; \text{lc} = 6 \; \text{mA}, \; \text{f} = 5.8 \; \text{GHz}, \\ \text{Zs} = \text{Zsopt}, \; \text{ZL} = \text{ZLopt} \end{array}$	9.5	11.5	-	dB
Reverse Transfer Capacitance	Cre Note 2	Vсв = 2 V, le = 0 mA, f = 1 MHz	-	0.12	0.25	pF
Maximum Stable Pow er Gain	MSG Note	$V_{CE} = 2 \text{ V}, \text{ lc} = 20 \text{ mA}, \text{ f} = 5.8 \text{ GHz}$	13	15	-	dB
Gain 1 dB Compression Output Pow er	Po (1 dB)	$V_{CE} = 2 \ V, \ lc_{(set)} = 6 \ mA, \\ f = 5.8 \ GHz, \ Z_{S} = Z_{Sopt}, \ Z_{L} = Z_{Lopt}$	-	9	-	dBm

Notes 1. Pulse measurement: PW $\leq 350~\mu\text{s}$, Duty Cycle $\leq 2\%$

2. Collector to base capacitance when the emitter grounded

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

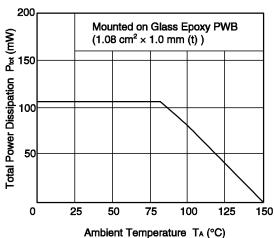
hfe CLASSIFICATION

<R>

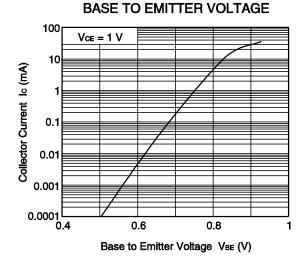
Rank	FB/YFB		
Marking	zK		
h _{FE} Value	270 to 540		

<R> TYPICAL CHARACTERISTICS (TA = +25°C, unless otherwise specified)

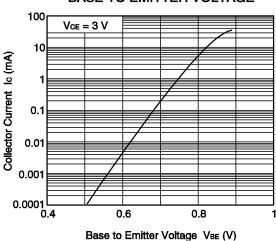




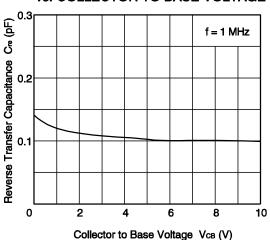
COLLECTOR CURRENT vs.



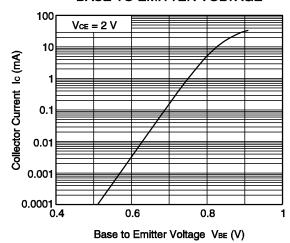
COLLECTOR CURRENT vs. **BASE TO EMITTER VOLTAGE**



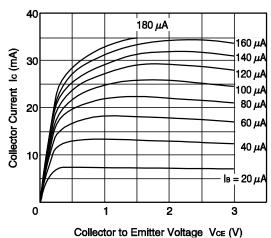
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



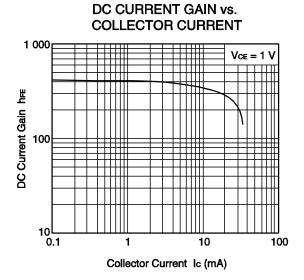
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



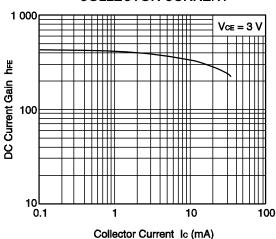
COLLECTOR CURRENT vs. **COLLECTOR TO EMITTER VOLTAGE**



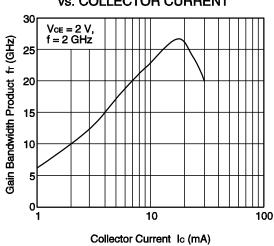
Remark The graphs indicate nominal characteristics.





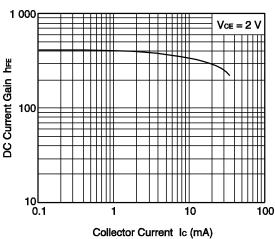


GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

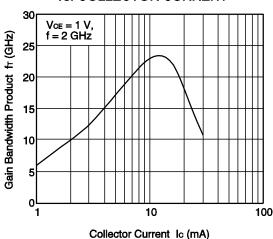


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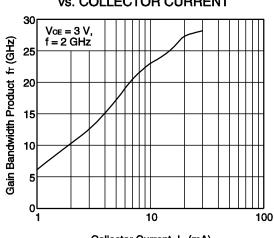
DC CURRENT GAIN vs. COLLECTOR CURRENT



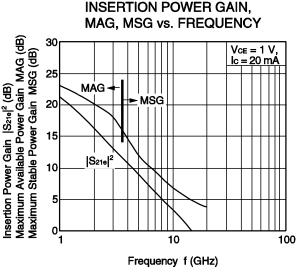
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

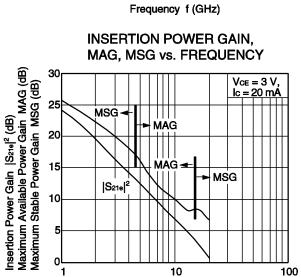


GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

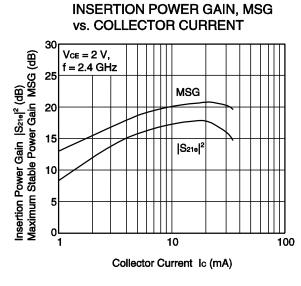


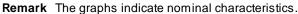
Collector Current Ic (mA)

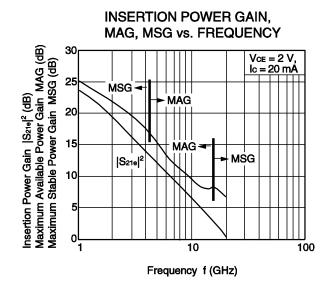


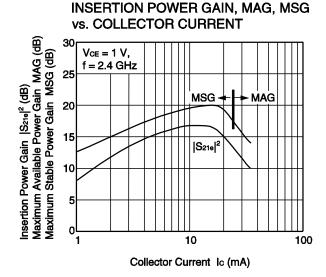


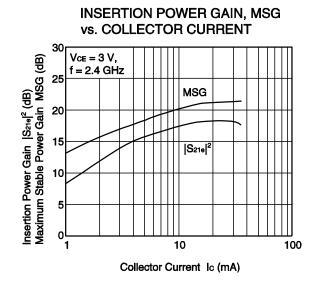
Frequency f (GHz)



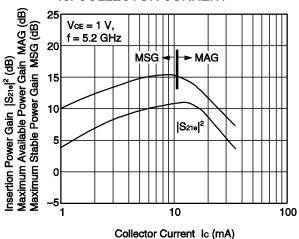




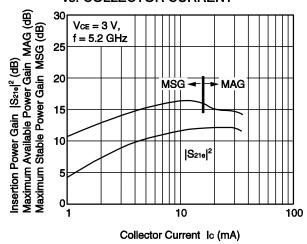




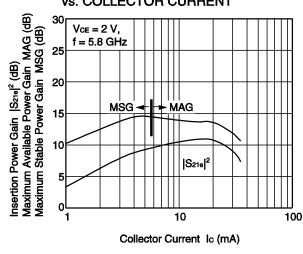
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

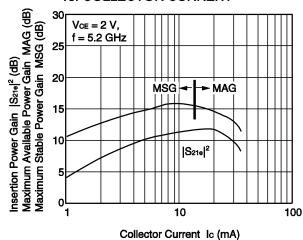


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

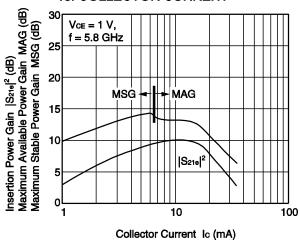


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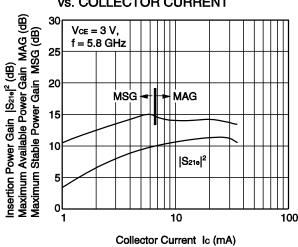
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

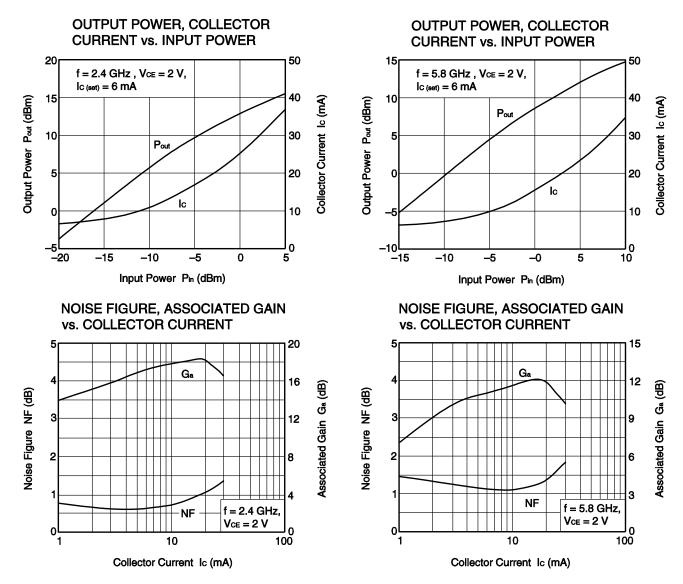


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT





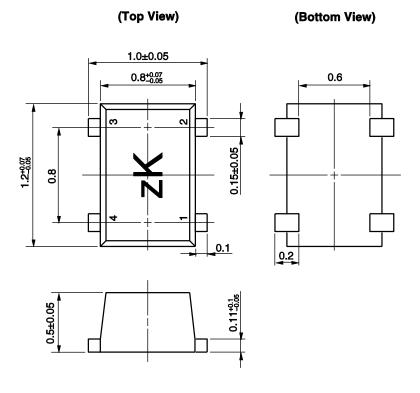
Remark The graphs indicate nominal characteristics.

<R> 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/

<R> PACKAGE DIMENSIONS

4-PIN LEAD-LESS MINIMOLD (M14, 1208 PKG) (UNIT: mm)



PIN CONNECTIONS

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