

# NPN SILICON GERMANIUM RF TRANSISTOR **NESG2101M16**

# NPN SIGE RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (125 mW) 6-PIN LEAD-LESS MINIMOLD (M16, 1208 PKG)

### FEATURES

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

 $P_{O (1 \text{ dB})} = 21 \text{ dBm TYP}$ . @ Vce = 3.6 V, Ic (set) = 10 mA (RF OFF), 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: VCEO (absolute maximum ratings) = 5.0 V
- 6-pin lead-less minimold (M16, 1208 PKG)

### <R> ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG2101M16	NESG2101M16-A	6-pin lead-less minimold (M16, 1208 PKG)	50 pcs (Non reel)	<ul><li>8 mm wide embossed taping</li><li>Pin 1 (Collector), Pin 6 (Emitter) face the</li></ul>
NESG2101M16-T3	NESG2101M16-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	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	Ptot Note	190	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to +150	°C

**Note** Mounted on 1.08 cm<sup>2</sup>  $\times$  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.

Document No. PU10395EJ03V0DS (3rd edition) Date Published September 2009 NS

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

# ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	Ісво	$V_{CB} = 5 V$ , $I_E = 0 mA$	-	-	100	nA
Emitter Cut-off Current	Іево	V <sub>EB</sub> = 1 V, Ic = 0 mA	_	-	100	nA
DC Current Gain	hfe Note 1	Vce = 2 V, lc = 15 mA	130	190	260	_
RF Characteristics						
Gain Bandwidth Product	fт	Vce = 3 V, Ic = 50 mA, f = 2 GHz	14	17	-	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	Vce = 3 V, lc = 50 mA, f = 2 GHz	11.5	13.5	_	dB
Noise Figure (1)	NF		-	0.9	1.2	dB
Noise Figure (2)	NF		_	0.6	-	dB
Associated Gain (1)	Ga		11.0	13.0	-	dB
Associated Gain (2)	Ga	$      V_{CE} = 2 \ V, \ I_C = 7 \ mA, \ f = 1 \ GHz, \\      Z_S = Z_{Sopt}, \ Z_L = Z_{Lopt} $	_	19.0	-	dB
Reverse Transfer Capacitance	Cre Note 2	Vсв = 2 V, IE = 0 mA, f = 1 MHz	-	0.4	0.5	pF
Maximum Stable Power Gain	MSG Note 3	Vce = 3 V, Ic = 50 mA, f = 2 GHz	14.5	17.0	-	dB
Gain 1 dB Compression Output Power	PO (1 dB)	V <sub>CE</sub> = 3.6 V, I <sub>C (set)</sub> = 10 mA (RF OFF), f = 2 GHz, Z <sub>S</sub> = Z <sub>Sopt</sub> , Z <sub>L</sub> = Z <sub>Lopt</sub>	-	21	-	dBm
Linear Gain	G∟	$\label{eq:Vce} \begin{array}{l} V_{CE} = 3.6 \ V, \ I_C = 10 \ mA, \ f = 2 \ GHz, \\ Z_S = Z_{Sopt}, \ Z_L = Z_{Lopt} \end{array}$	-	15	-	dBm

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

2. Collector to base capacitance when the emitter grounded

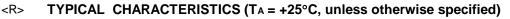
$$3. \text{ MSG} = \left| \frac{S_{21}}{S_{12}} \right|$$

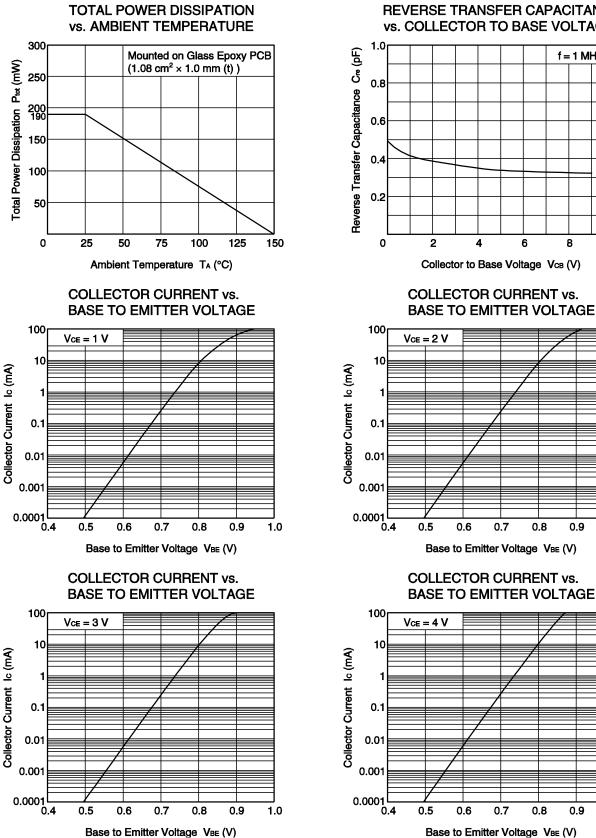
# **hfe CLASSIFICATION**

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Rank	FB/YFB		
Marking	zH		
hfe Value	130 to 260		

f = 1 MHz





### **REVERSE TRANSFER CAPACITANCE** vs. COLLECTOR TO BASE VOLTAGE

4

0.6

0.6

0.7

0.8

0.9

0.7

0.8

0.9

1.0

6

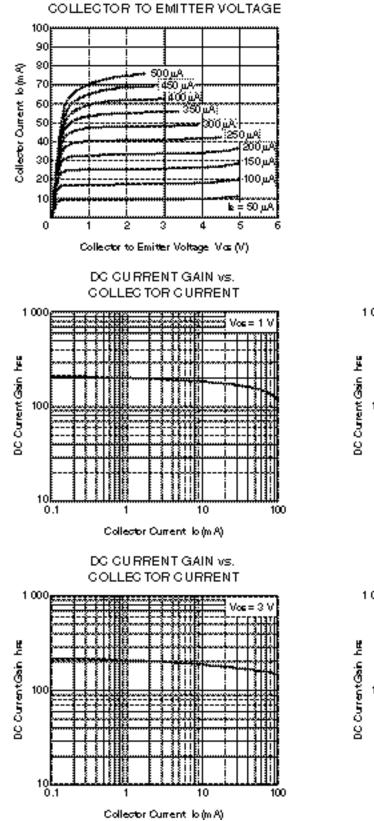
8

10

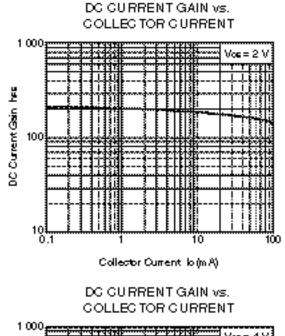
Remark The graphs indicate nominal characteristics.

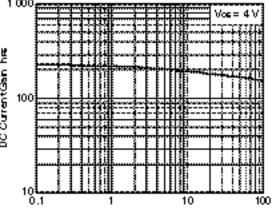
1.0

COLLECTOR CURRENT vs.

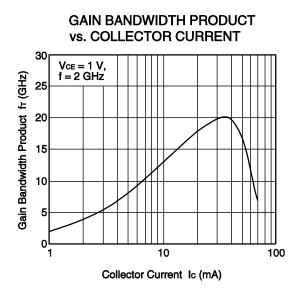




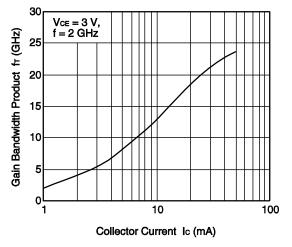




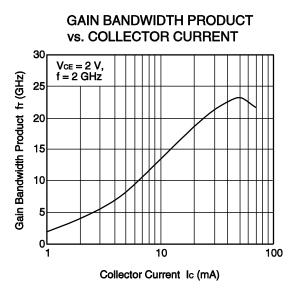
Collector Current Io (m A)



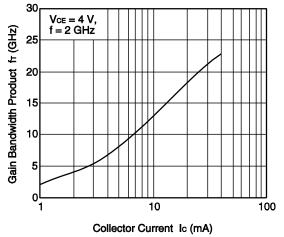


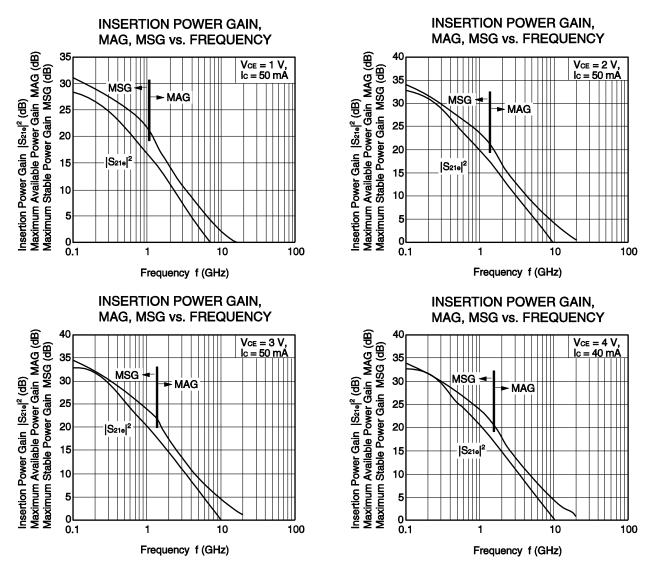


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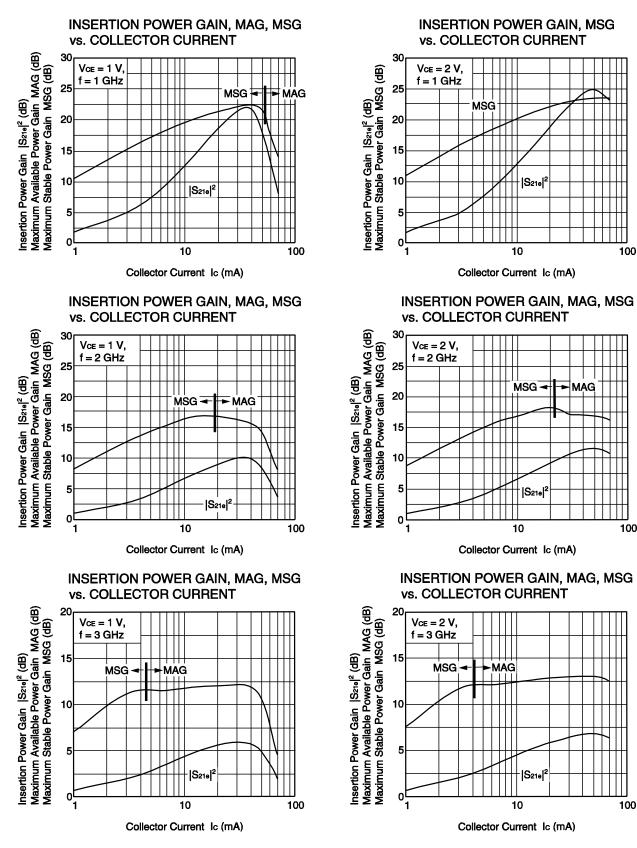




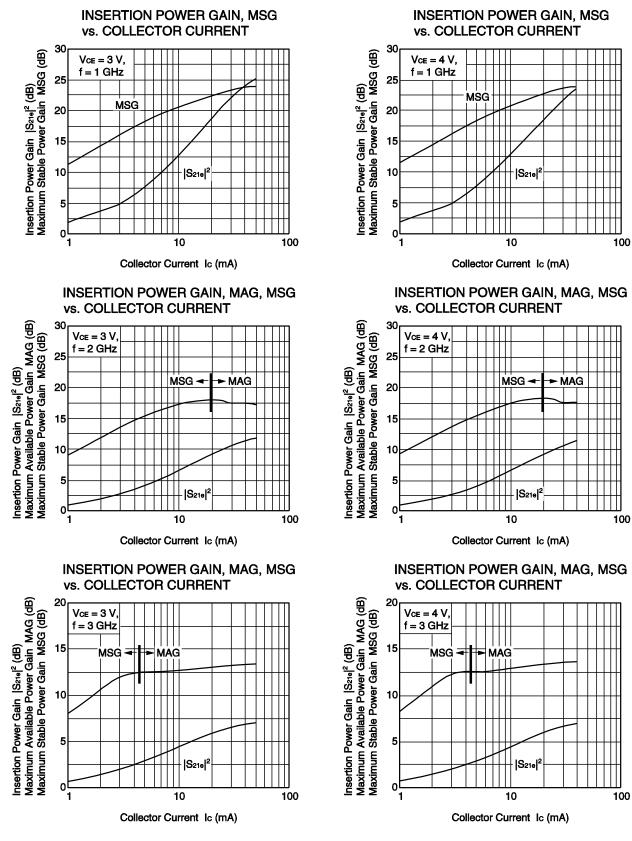




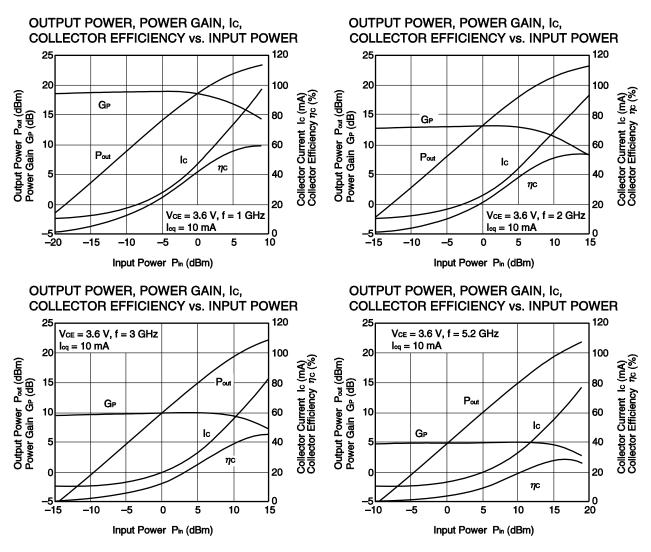
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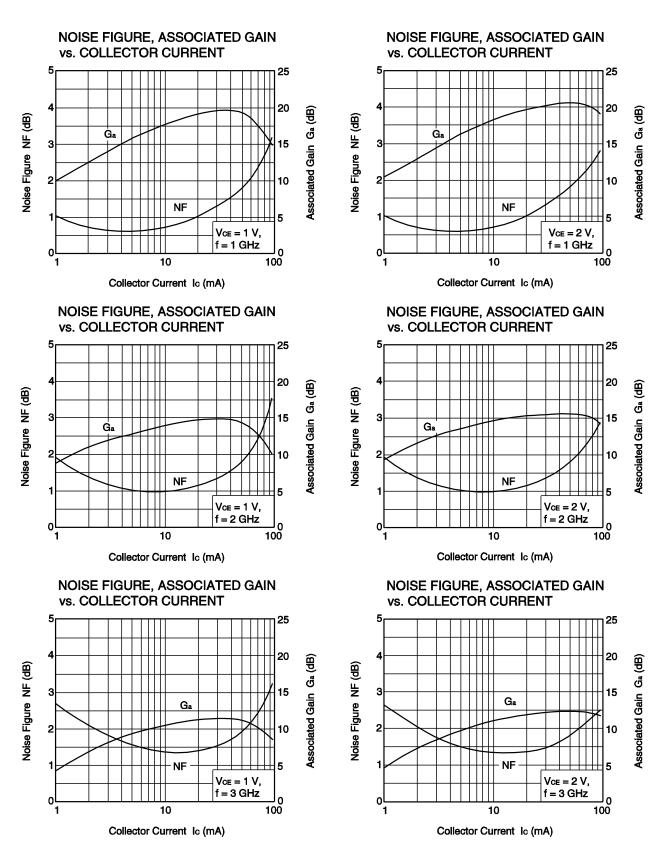
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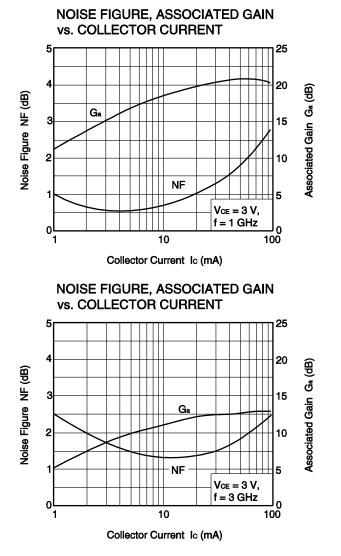


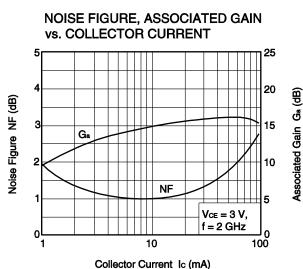
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Data Sheet PU10395EJ03V0DS





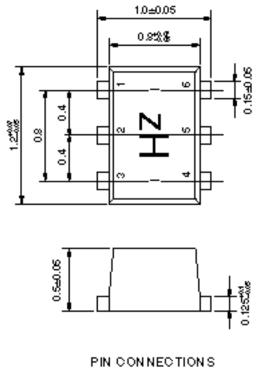
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### <R> S-PARAMETERS

- 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/

# PACKAGE DIMENSIONS

## 6-PIN LEAD-LESS MINIMOLD (M16, 1208 PKG) (UNIT: mm)





- 4. Base
- 5. Emitter
- 6. Emitter
- Caution All four Emitter-pins should be connected to PWB in order to obtain better Electrical performance and heat sinking.