

PRELIMINARY DATA SHEET

NEC

NPN SILICON GERMANIUM RF TRANSISTOR

NESG3031M14

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

FEATURES

- The device is an ideal choice for low noise, high-gain amplification
NF = 0.95 dB TYP., $G_a = 10.0$ dB TYP. @ $V_{CE} = 2$ V, $I_c = 6$ mA, $f = 5.2$ GHz
NF = 1.1 dB TYP., $G_a = 9.5$ dB TYP. @ $V_{CE} = 2$ V, $I_c = 6$ mA, $f = 5.8$ GHz
- Maximum stable power gain: MSG = 15.0 dB TYP. @ $V_{CE} = 3$ V, $I_c = 20$ mA, $f = 5.8$ GHz
- SiGe HBT technology (UHS3) adopted: $f_{max} = 110$ GHz
- 4-pin lead-less minimold (M14, 1208 package)

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NESG3031M14	50 pcs (Non reel)	8 mm wide embossed taping - Pin 1 (Collector), Pin 4 (Emitter) face the perforation side of the tape
NESG3031M14-T3	10 kpcs/reel	

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

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^{\circ}\text{C}$)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	12.0	V
Collector to Emitter Voltage	V_{CEO}	4.3	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_c	35	mA
Total Power Dissipation	P_{tot}^{Note}	150	mW
Junction Temperature	T_j	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^{\circ}\text{C}$

Note Mounted on $1.08\text{ cm}^2 \times 1.0\text{ mm}$ (t) glass epoxy PCB

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

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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

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 = 6 mA	220	300	380	–
RF Characteristics						
Insertion Power Gain	S _{21e} ²	V _{CE} = 3 V, I _C = 20 mA, f = 5.8 GHz	6.5	9.0	–	dB
Noise Figure (1)	NF	V _{CE} = 2 V, I _C = 6 mA, f = 5.2 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	0.95	–	dB
Noise Figure (2)	NF	V _{CE} = 2 V, I _C = 6 mA, f = 5.8 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	1.1	1.5	dB
Associated Gain (1)	G _a	V _{CE} = 2 V, I _C = 6 mA, f = 5.2 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	10.0	–	dB
Associated Gain (2)	G _a	V _{CE} = 2 V, I _C = 6 mA, f = 5.8 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	7.5	9.5	–	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 2 V, I _E = 0 mA, f = 1 MHz	–	0.15	0.25	pF
Maximum Stable Power Gain	MSG ^{Note 3}	V _{CE} = 3 V, I _C = 20 mA, f = 5.8 GHz	12.0	15.0	–	dB
Gain 1 dB Compression Output Power	P _O (1 dB)	V _{CE} = 3 V, I _{C (set)} = 20 mA, f = 5.8 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	13.0	–	dBm
3rd Order Intermodulation Distortion Output Intercept Point	OIP ₃	V _{CE} = 3 V, I _{C (set)} = 20 mA, f = 5.8 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	18.0	–	dBm

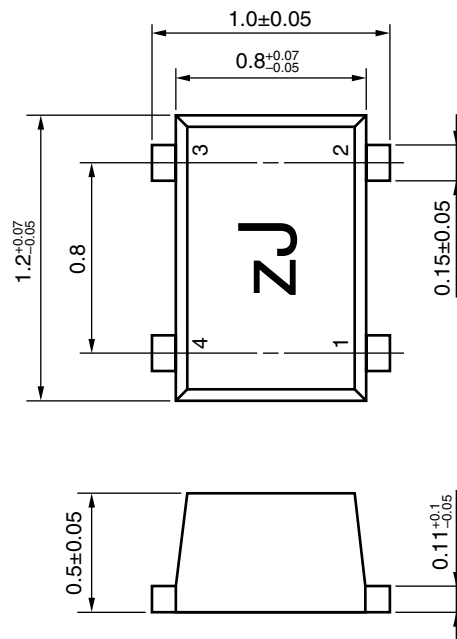
- Notes**
1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
 2. Collector to base capacitance when the emitter grounded
 3. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

Rank	FB
Marking	zJ
h _{FE} Value	220 to 380

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

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

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