



NPN SILICON GERMANIUM RF TRANSISTOR

NESG3033M14

NPN SiGe 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 = 0.6 dB TYP. @ $V_{CE} = 2\text{ V}$, $I_c = 6\text{ mA}$, $f = 2.0\text{ GHz}$
- Maximum stable power gain: MSG = 20.5 dB TYP. @ $V_{CE} = 2\text{ V}$, $I_c = 15\text{ mA}$, $f = 2.0\text{ GHz}$
- SiGe HBT technology (UHS3) adopted: $f_{max} = 110\text{ GHz}$
- This product is improvement of ESD of NESG3032M14.
- 4-pin lead-less minimold (M14, 1208 PKG)

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG3033M14	NESG3033M14-A	4-pin lead-less minimold (M14, 1208 PKG) (Pb-Free)	50 pcs (Non reel)	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 1 (Collector), Pin 4 (Emitter) face the perforation side of the tape
NESG3033M14-T3	NESG3033M14-T3-A		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} ^{Note 1}	5.0	V
Collector to Emitter Voltage	V_{CEO}	4.3	V
Base Current	I_B ^{Note 1}	12	mA
Collector Current	I_c	35	mA
Total Power Dissipation	P_{tot} ^{Note 2}	150	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Notes 1. V_{CBO} and I_B are limited by the permissible current of the protection element.

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

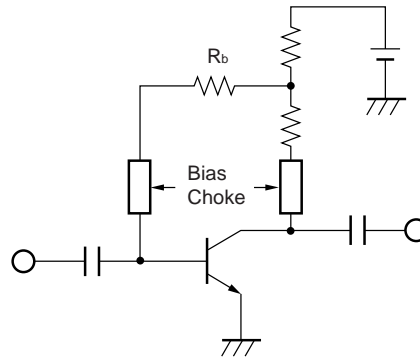
Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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RECOMMENDED OPERATING RANGE ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Input Power	P_{in}	–	–	0	dBm
Base Feedback Resistor	R_b	–	–	100	$k\Omega$

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 (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I _{CB0}	V _{CB} = 5 V, I _E = 0 mA	–	–	100	nA
Emitter Cut-off Current	I _{EB0}	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} = 2 V, I _C = 15 mA, f = 2.0 GHz	15.0	17.5	–	dB
Noise Figure	NF	V _{CE} = 2 V, I _C = 6 mA, f = 2.0 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	0.60	0.85	dB
Associated Gain	G _a	V _{CE} = 2 V, I _C = 6 mA, f = 2.0 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	17.5	–	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} = 2 V, I _C = 15 mA, f = 2.0 GHz	17.5	20.5	–	dB
Gain 1 dB Compression Output Power	P _{O(1 dB)}	V _{CE} = 3 V, I _{C(set)} = 20 mA, f = 2.0 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	12.5	–	dBm
3rd Order Intermodulation Distortion Output Intercept Point	OIP ₃	V _{CE} = 3 V, I _{C(set)} = 20 mA, f = 2.0 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	24.0	–	dBm

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

2. Collector to base capacitance when the emitter grounded

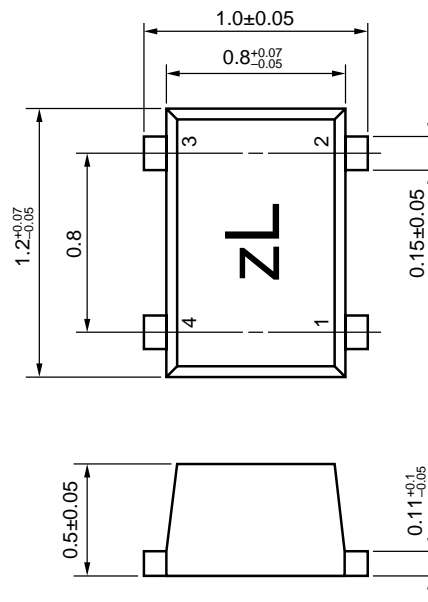
$$3. \text{MSG} = \left| \frac{S_{21}}{S_{12}} \right|$$

h_{FE} CLASSIFICATION

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

PACKAGE DIMENSIONS

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



PIN CONNECTIONS

1. Collector
2. Emitter
3. Base
4. NC (Connected with Pin 2)

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This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

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