

DATA SHEET

NEC

NPN SILICON GERMANIUM RF TRANSISTOR

NESG2046M33

NPN SiGe RF TRANSISTOR FOR LOW NOISE, HIGH-GAIN AMPLIFICATION 3-PIN SUPER LEAD-LESS MINIMOLD (M33, 0804 PKG)

FEATURES

- The device is an ideal choice for low noise, high-gain amplification
NF = 0.8 dB TYP., $G_a = 11.5$ dB TYP. @ $V_{CE} = 1$ V, $I_c = 3$ mA, $f = 2$ GHz
- High breakdown voltage technology for SiGe Tr. adopted: V_{CEO} (absolute maximum ratings) = 5.0 V
- 3-pin super lead-less minimold (M33, 0804 PKG) package

<R> ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG2046M33	NESG2046M33-A	3-pin super lead-less minimold (M33, 0804 PKG) (Pb-Free)	50 pcs (Non reel)	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 2 (Base) face the perforation side of the tape
NESG2046M33-T3	NESG2046M33-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}	13	V
Collector to Emitter Voltage	V_{CEO}	5	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_c	40	mA
Total Power Dissipation	P_{tot}^{Note}	130	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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ELECTRICAL CHARACTERISTICS (T_A = +25°C)

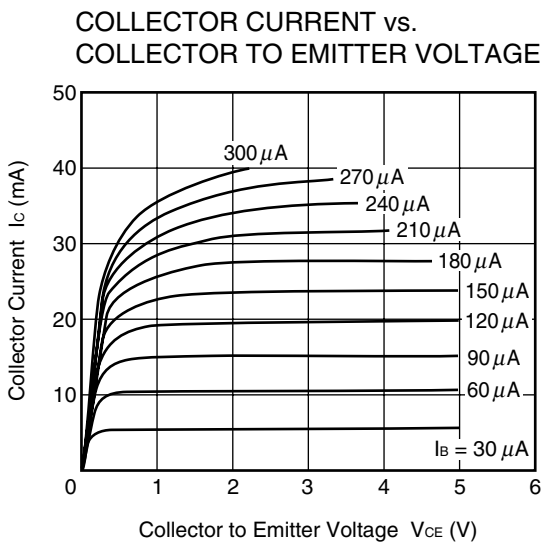
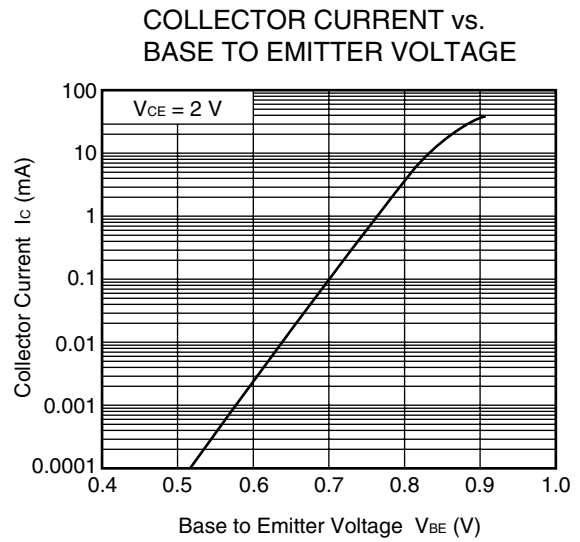
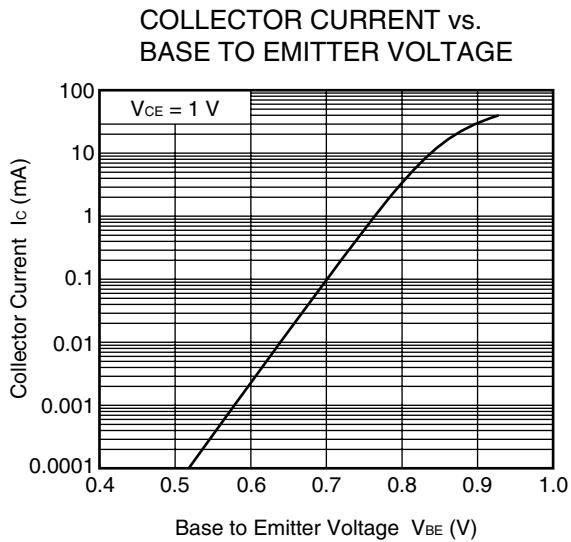
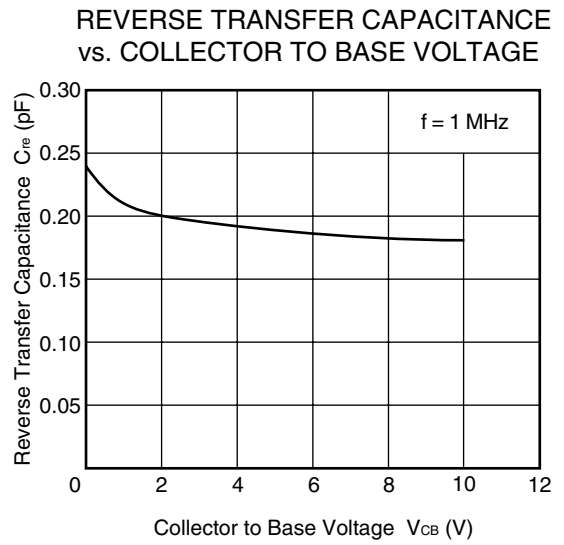
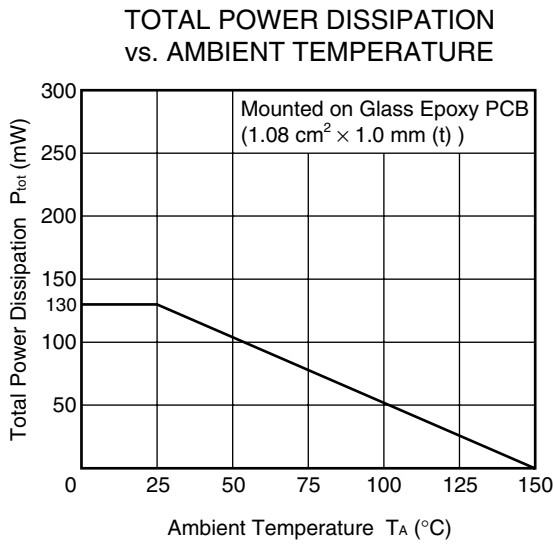
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I _{CBO}	V _{CB} = 5 V, I _E = 0 mA	–	–	100	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 0.5 V, I _C = 0 mA	–	–	100	nA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 1 V, I _C = 2 mA	140	180	220	–
RF Characteristics						
Gain Bandwidth Product	f _T	V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz	15	18	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz	11	13	–	dB
Noise Figure	NF	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	0.8	1.5	dB
Associated Gain	G _a	V _{CE} = 1 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	9.5	11.5	–	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 1 V, I _E = 0 mA, f = 1 MHz	–	0.2	0.4	pF

- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
 2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

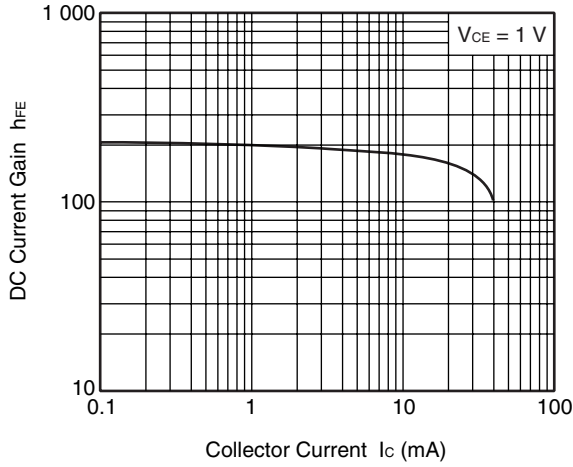
Rank	FB
Marking	T7
h _{FE} Value	140 to 220

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

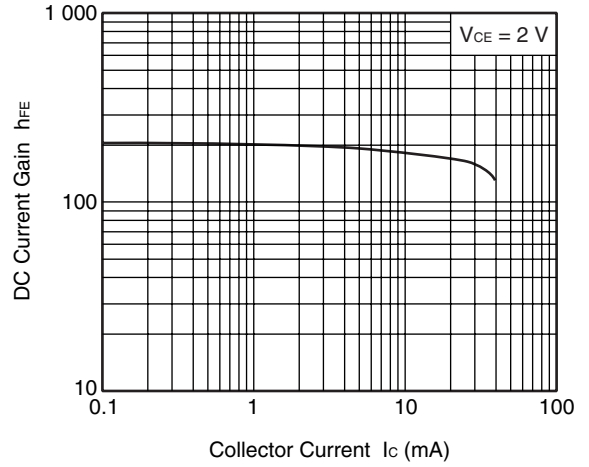


Remark The graphs indicate nominal characteristics.

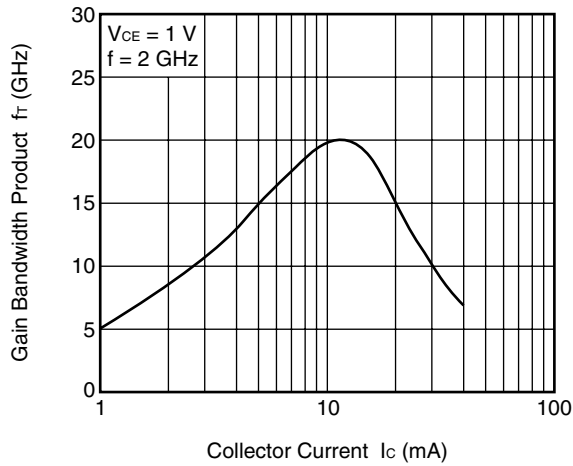
DC CURRENT GAIN vs. COLLECTOR CURRENT



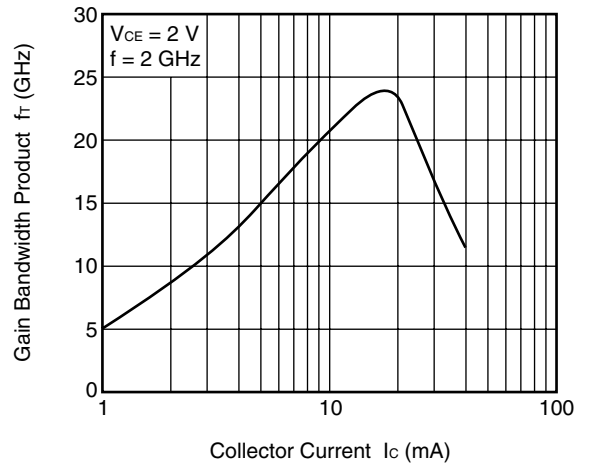
DC CURRENT GAIN vs. COLLECTOR CURRENT



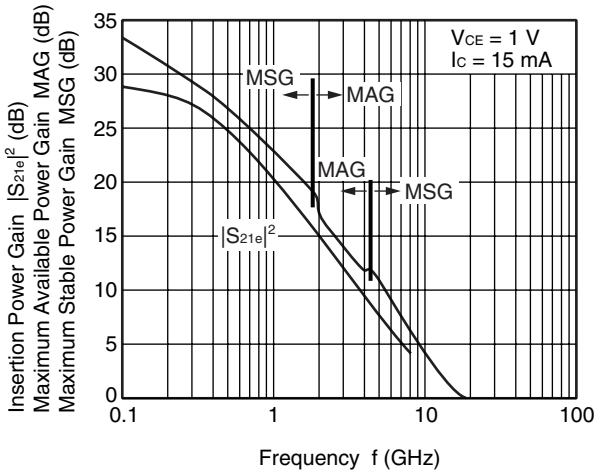
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



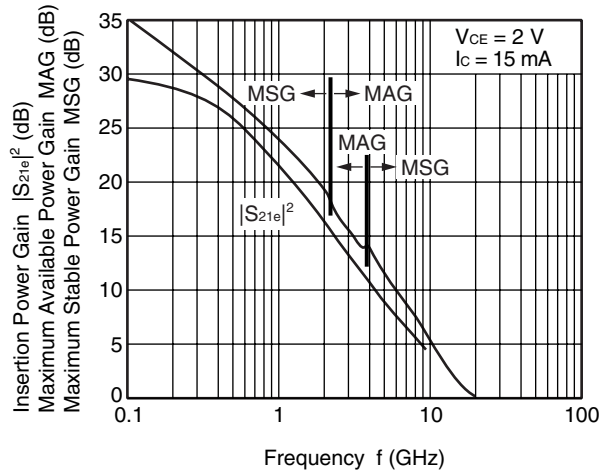
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY

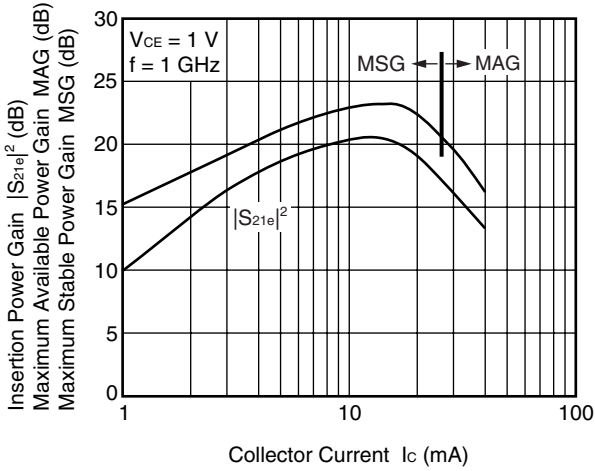


INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY

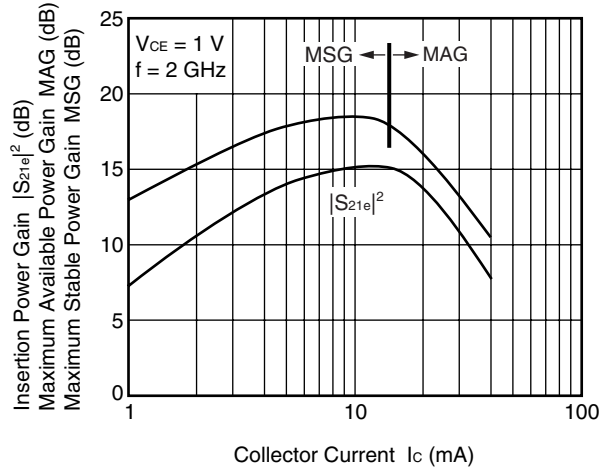


Remark The graphs indicate nominal characteristics.

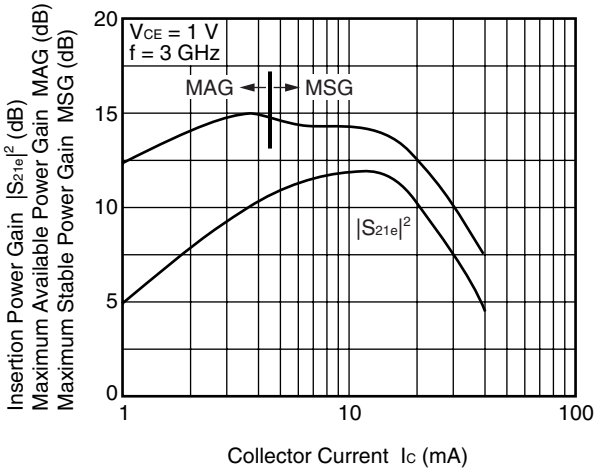
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



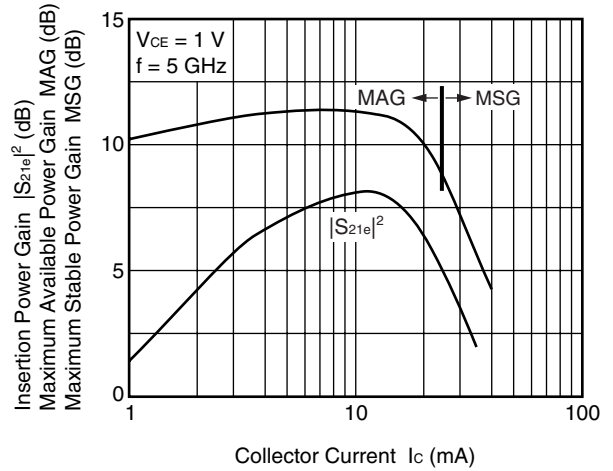
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



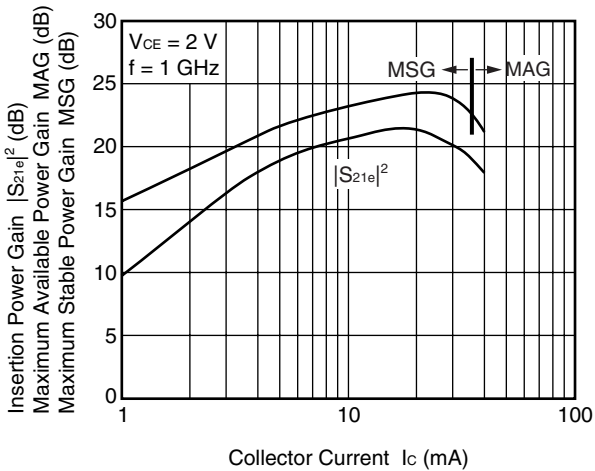
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



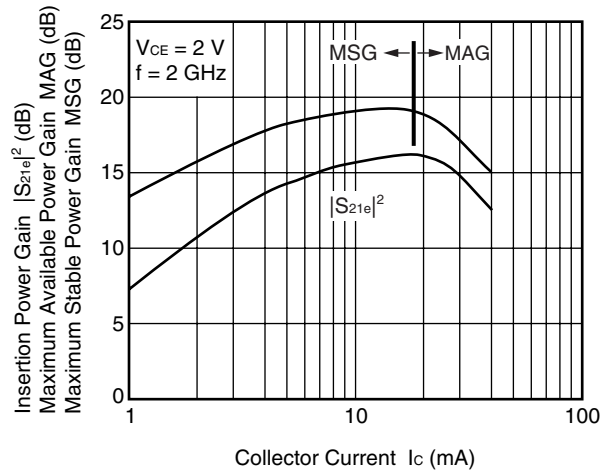
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

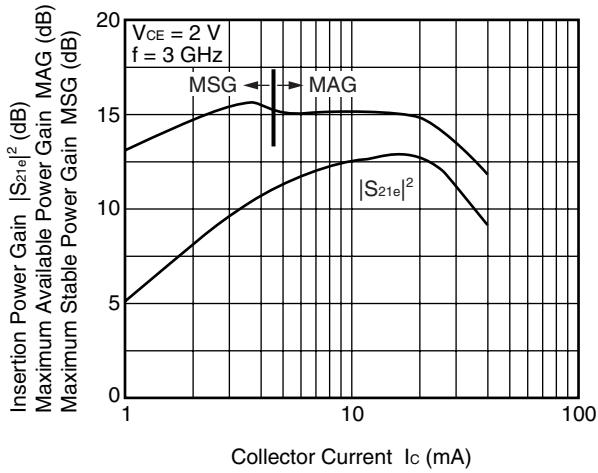


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

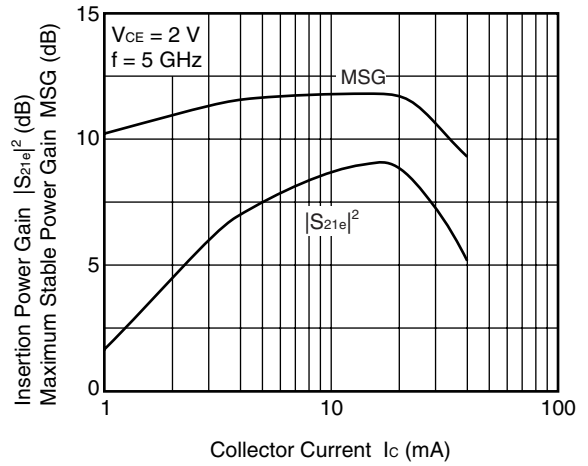


Remark The graphs indicate nominal characteristics.

INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, 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.

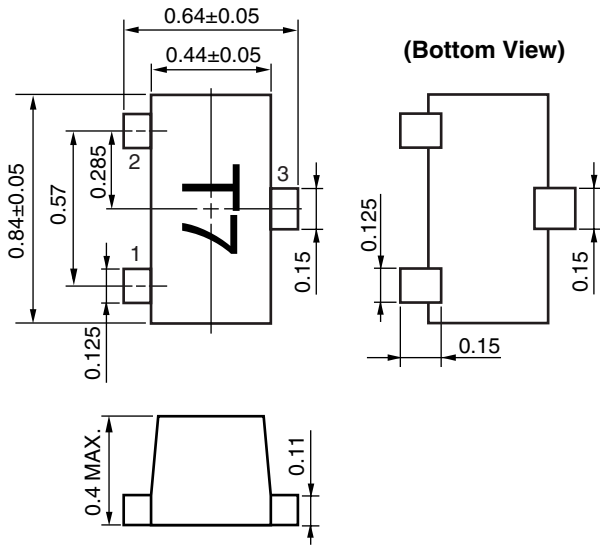
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.necel.com/microwave/en/>

PACKAGE DIMENSIONS

3-PIN SUPER LEAD-LESS MINIMOLD (M33, 0804 PKG) (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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