DATA SHEET

NEC

NPN SILICON GERMANIUM RF TRANSISTOR
NESG2101M16

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

FEATURES

- The device is an ideal choice for medium output power, high-gain amplification and low distortion, low noise, high-gain amplification
  $P_{O\ (1\ dB)}$ = 21 dBm TYP. @ V_{CE} = 3.6 V, $I_{C\ (set)}$ = 10 mA (RF OFF), f = 2 GHz
  NF = 0.6 dB TYP., G_a = 19.0 dB TYP. @ V_{CE} = 2 V, I_C = 7 mA, f = 1 GHz
- Maximum stable power gain: MSG = 17.0 dB TYP. @ V_{CE} = 3 V, I_C = 50 mA, f = 2 GHz
- High breakdown voltage technology for SiGe Tr. adopted: V_{CEO} (absolute maximum ratings) = 5.0 V
- 6-pin lead-less minimold (M16, 1208 package)

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NESG2101M16	50 pcs (Non reel)	• 8 mm wide embossed taping
NESG2101M16-T3	10 kpcs/reel	• Pin 1 (Collector), Pin 6 (Emitter) face the perforation side of the tape

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

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	13.0	V
Collector to Emitter Voltage	V_{CEO}	5.0	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_{tot} Note	190	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note Mounted on 1.08 cm^2 × 1.0 mm (t) glass epoxy PCB

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

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The mark ★ shows major revised points.

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 = 15 mA	130	190	260	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 50 mA, f = 2 GHz	14	17	–	GHz
Insertion Power Gain	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 50 mA, f = 2 GHz	11.5	13.5	–	dB
Noise Figure (1)	NF	V_{CE} = 2 V, I_C = 10 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	0.9	1.2	dB
Noise Figure (2)	NF	V_{CE} = 2 V, I_C = 7 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	0.6	–	dB
Associated Gain (1)	G_a	V_{CE} = 2 V, I_C = 10 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	11.0	13.0	–	dB
Associated Gain (2)	G_a	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	C_{re} Note 2	V_{CB} = 2 V, I_E = 0 mA, f = 1 MHz	–	0.4	0.5	pF
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 3 V, I_C = 50 mA, f = 2 GHz	14.5	17.0	–	dB
Gain 1 dB Compression Output Power	$P_{O\,(1\,dB)}$	V_{CE} = 3.6 V, $I_{C\,(set)}$ = 10 mA (RF OFF), f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	21	–	dBm
Linear Gain	G_L	V_{CE} = 3.6 V, I_C = 10 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	15	–	dBm

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

2. Collector to base capacitance when the emitter grounded

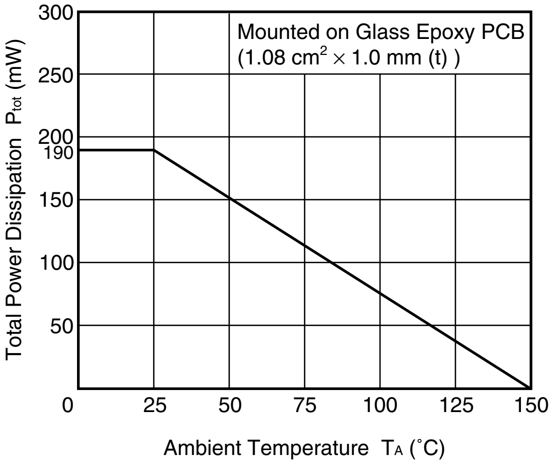
3. $MSG = \left|\frac{S_{21}}{S_{12}}\right|$

h_{FE} CLASSIFICATION

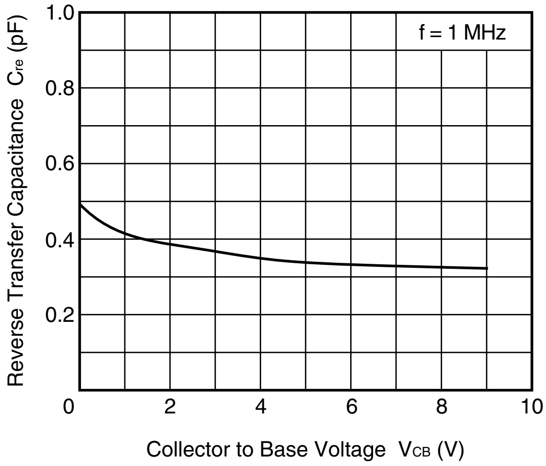
Rank	FB
Marking	zH
h_{FE} Value	130 to 260

★ TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

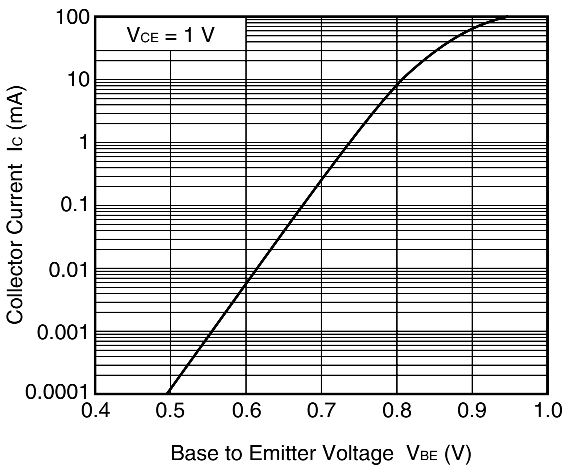
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



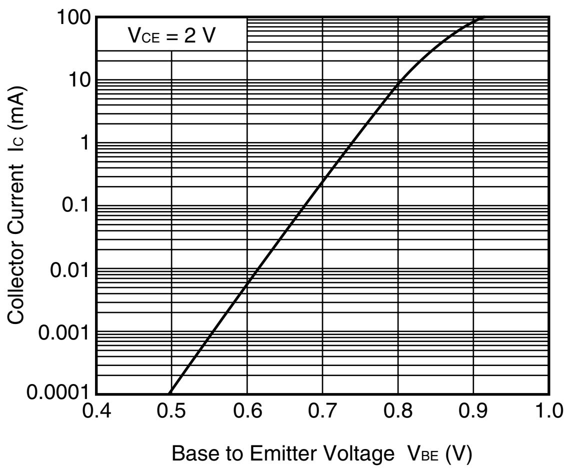
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



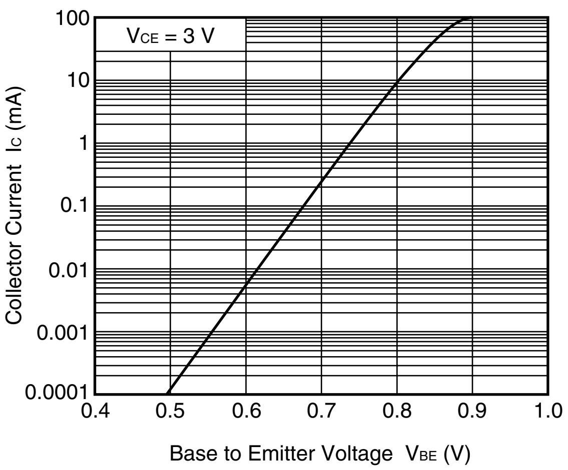
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



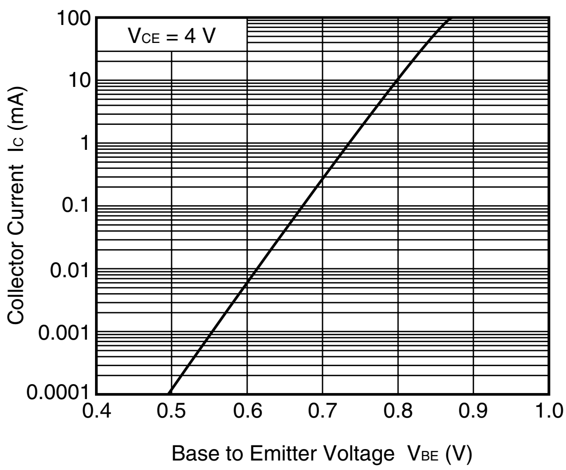
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

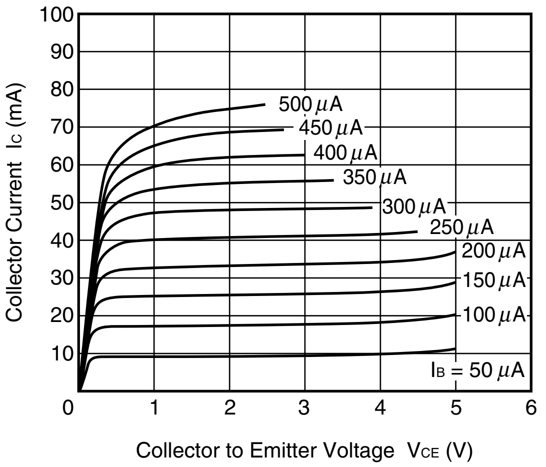


COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

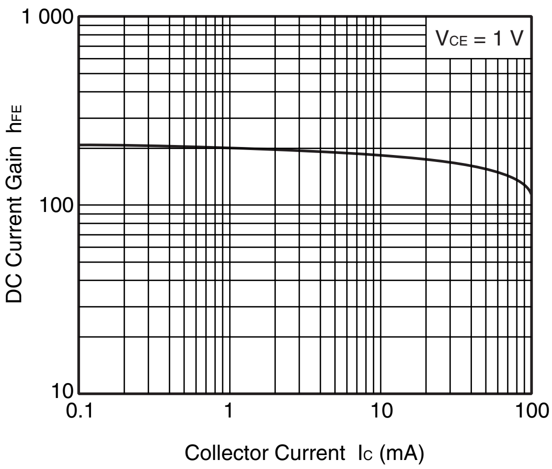


Remark The graphs indicate nominal characteristics.

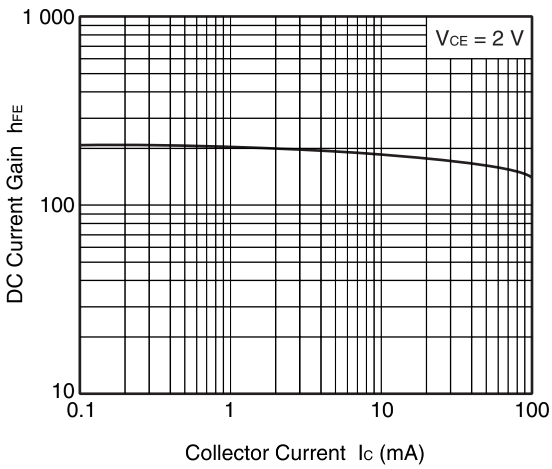
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



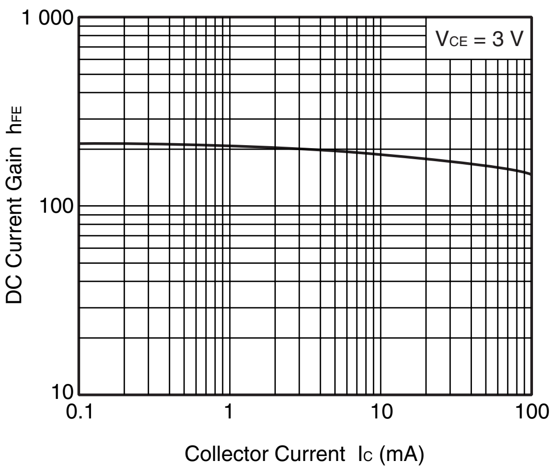
DC CURRENT GAIN vs.
COLLECTOR CURRENT



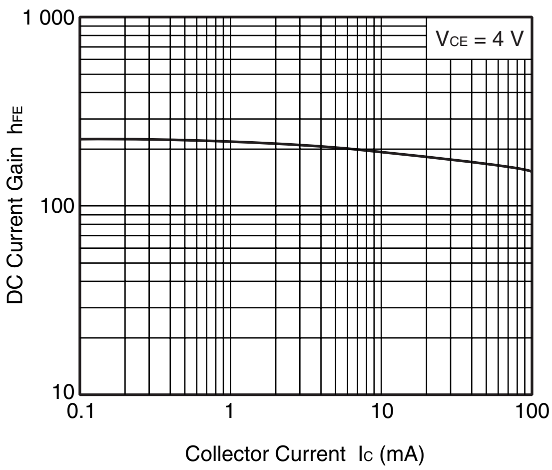
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



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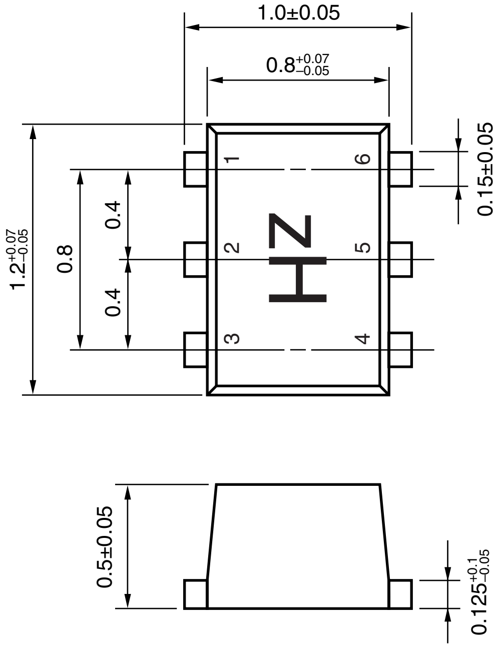
PACKAGE DIMENSIONS

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



PIN CONNECTIONS

1. Collector
2. Emitter
3. Emitter
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.

▶For further information, please contact

NEC Compound Semiconductor Devices, Ltd. **http://www.csd-nec.com/**
E-mail: salesinfo@csd-nec.com (sales and general)
techinfo@csd-nec.com (technical)
5th Sales Group, Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579

NEC Compound Semiconductor Devices Hong Kong Limited
E-mail: ncsd-hk@elhk.nec.com.hk (sales, technical and general)

Hong Kong Head Office	TEL: +852-3107-7303	FAX: +852-3107-7309
Taipei Branch Office	TEL: +886-2-8712-0478	FAX: +886-2-2545-3859
Korea Branch Office	TEL: +82-2-558-2120	FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH **http://www.ee.nec.de/**
TEL: +49-211-6503-01 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. **http://www.cel.com/**
TEL: +1-408-988-3500 FAX: +1-408-988-0279