

NESG3400M01

R09DS0025EJ0100

Rev.1.00

Jul 26, 2011

NPN Silicon Germanium RF Transistor

DESCRIPTION

The NESG3400M01 is an ideal choice for low noise, low distortion amplification.

FEATURES

- NF = 0.65 dB TYP. @ $V_{CE} = 3.3$ V, $I_C = 15$ mA, $f = 1$ GHz
- $P_{o(1\text{ dB})} = 21$ dBm TYP. @ $V_{CE} = 3.3$ V, $I_{C(\text{set})} = 40$ mA, $f = 1$ GHz
- $OIP_3 = 35.5$ dBm TYP. @ $V_{CE} = 3.3$ V, $I_{C(\text{set})} = 50$ mA, $f = 1$ GHz
- Maximum stable power gain: MSG = 13.0 dB TYP. @ $V_{CE} = 3.3$ V, $I_C = 40$ mA, $f = 1$ GHz
- SiGe HBT technology (UHS3) : $f_T = 10$ GHz
- This product is improvement of ESD
- 6-pin super minimold (M01 PKG)

APPLICATIONS

- Suitable for up to 1 GHz applications.
e.g. LNA (Low Noise Amplifier) or Power splitter for Digital-TV.

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG3400M01	NESG3400M01-A	6-pin super minimold (M01 PKG) (Pb-Free)	50 pcs (Non reel)	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 4, 5, 6 face the perforation side of the tape
NESG3400M01-T1	NESG3400M01-T1-A		3 kpcs/reel	

Remark To order evaluation samples, please 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}	5.5	V
Collector to Emitter Voltage (Base Short)	V_{CES}	13	V
Collector to Emitter Voltage (Base Open)	V_{CEO}	5.5	V
Base Current ^{Note1}	I_B	36	mA
Collector Current	I_C	400	mA
Total Power Dissipation ^{Note2}	P_{tot}	480	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Notes: 1. Depend on the ESD protect device.

2. Mounted on 3.8 cm × 9.0 cm × 0.8 mm (t) glass epoxy PWB

CAUTION

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

THERMAL RESISTANCE (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Thermal Resistance from Junction to Ambient ^{Note}	R _{thj-a}	260	°C/W

Note: Mounted on 3.8 cm × 9.0 cm × 0.8 mm (t) glass epoxy PWB

RECOMMENDED OPERATING RANGE (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Collector Current	I _C	–	50	–	mA

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	–	–	100	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 0.4 V, I _C = 0	–	–	100	nA
DC Current Gain	h _{FE} ^{Note1}	V _{CE} = 3.3 V, I _C = 15 mA	200	300	400	–
RF Characteristics						
Gain Bandwidth Product	f _T	V _{CE} = 3.3 V, I _C = 40 mA, f = 1 GHz	–	10.0	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 3.3 V, I _C = 40 mA, f = 1 GHz	9.5	11.5	–	dB
Noise Figure (1)	NF1	V _{CE} = 3.3 V, I _C = 15 mA, f = 1 GHz, Z _S = Z _{Sopt} , Z _L = 50 Ω	–	0.65	1.05	dB
Noise Figure (2)	NF2	V _{CE} = 3.3 V, I _C = 40 mA, f = 1 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	0.7	–	dB
Associated Gain (1)	G _{a1}	V _{CE} = 3.3 V, I _C = 15 mA, f = 1 GHz, Z _S = Z _{Sopt} , Z _L = 50 Ω	9.5	11.5	–	dB
Associated Gain (2)	G _{a2}	V _{CE} = 3.3 V, I _C = 40 mA, f = 1 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	12.0	–	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 3.3 V, I _E = 0, f = 1 MHz	–	0.9	1.1	pF
Maximum Stable Power Gain	MSG ^{Note 3}	V _{CE} = 3.3 V, I _C = 40 mA, f = 1 GHz	11.0	13.0	–	dB
Gain 1 dB Compression Output Power	P _{O(1dB)}	V _{CE} = 3.3 V, I _{C(set)} = 40 mA, f = 1 GHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	21.0	–	dBm
Output 3rd Order Intercept Point 1	OIP _{3 1}	V _{CE} = 3.3 V, I _{C(set)} = 40 mA, f = 1 GHz, Δf = 1 MHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	35.0	–	dBm
Output 3rd Order Intercept Point 2	OIP _{3 2}	V _{CE} = 3.3 V, I _{C(set)} = 50 mA, f = 1 GHz, Δf = 1 MHz, Z _S = Z _{Sopt} , Z _L = Z _{Lopt}	–	35.5	–	dBm

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

2. Collector to base capacitance when the emitter grounded.

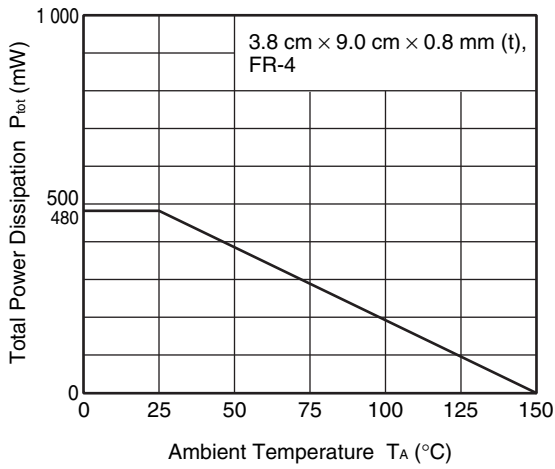
$$3. \text{MSG} = \left| \frac{S_{21}}{S_{12}} \right|$$

h_{FE} CLASSIFICATION

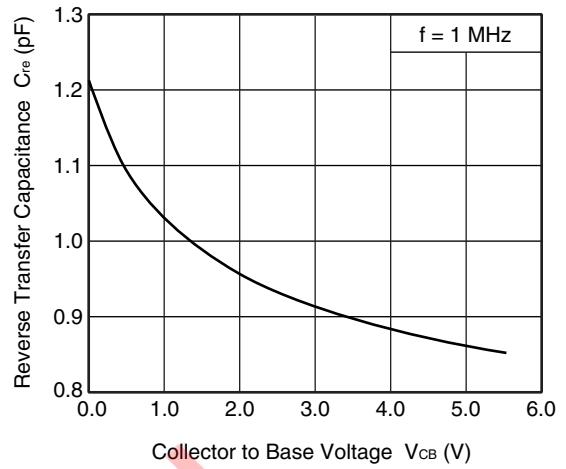
Rank	YFB
Marking	T1Q
h _{FE} Value	200 to 400

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

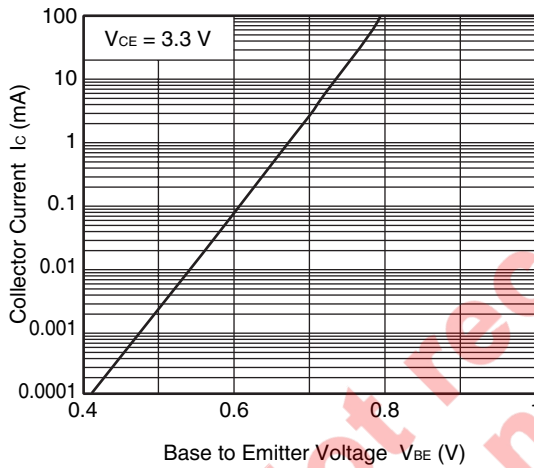
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



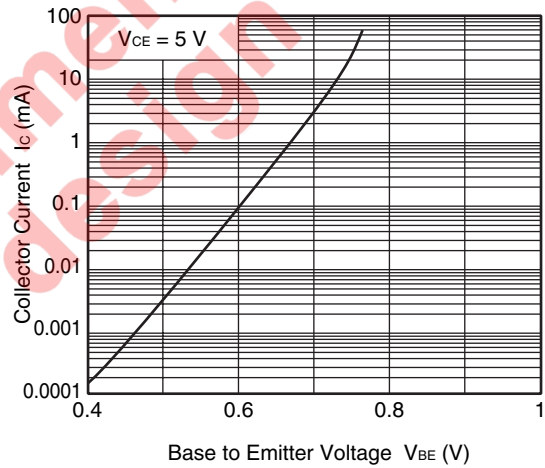
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



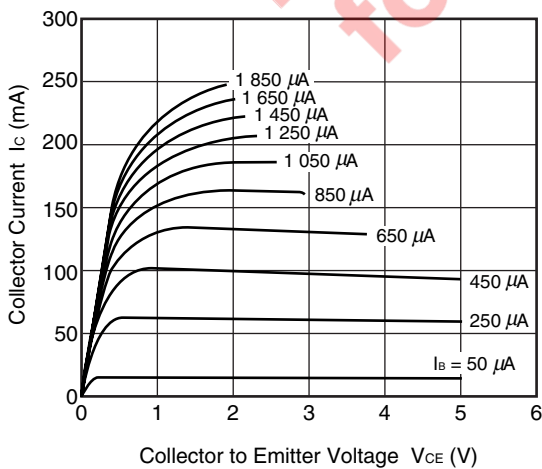
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

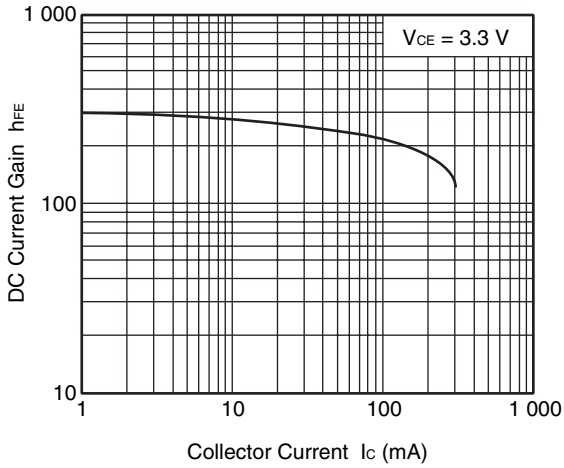


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

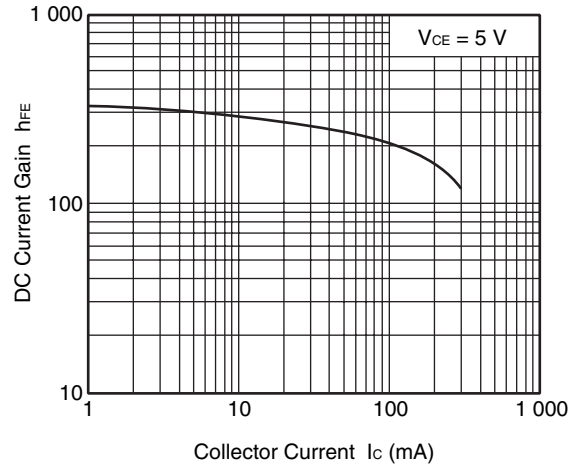


Remark The graphs indicate nominal characteristics.

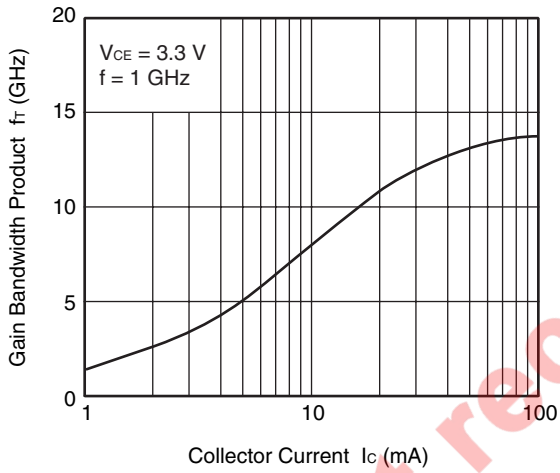
DC CURRENT GAIN vs. COLLECTOR CURRENT



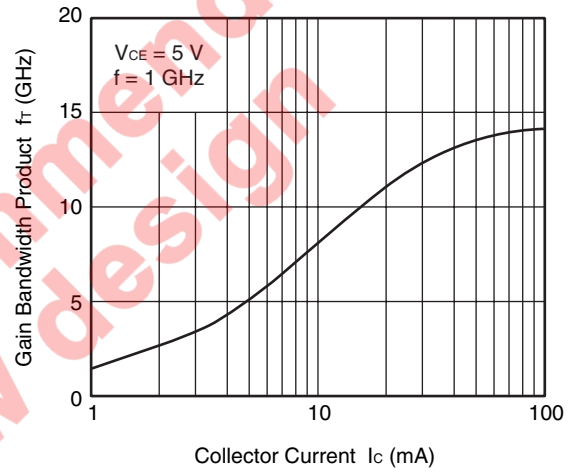
DC CURRENT GAIN vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

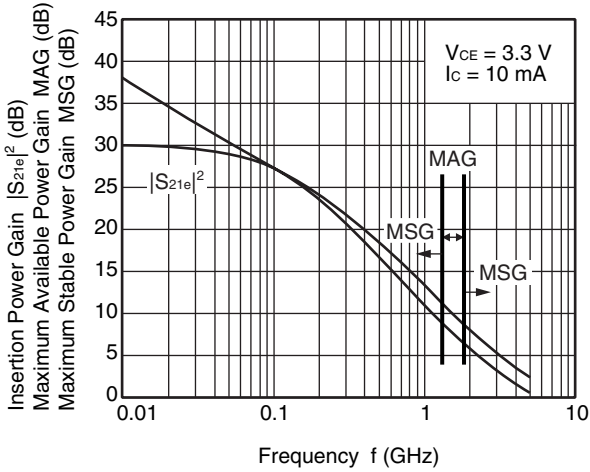


GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

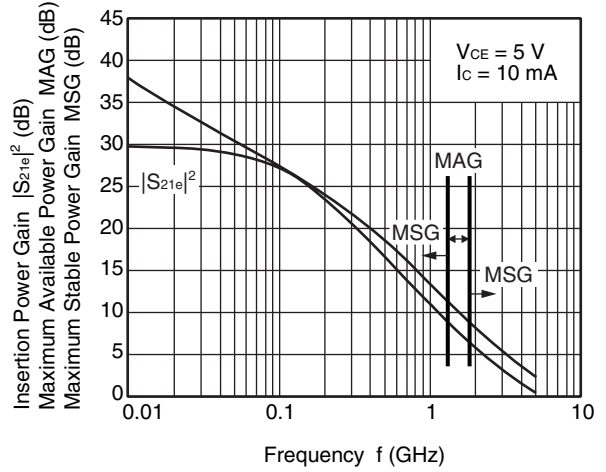


Remark The graphs indicate nominal characteristics.

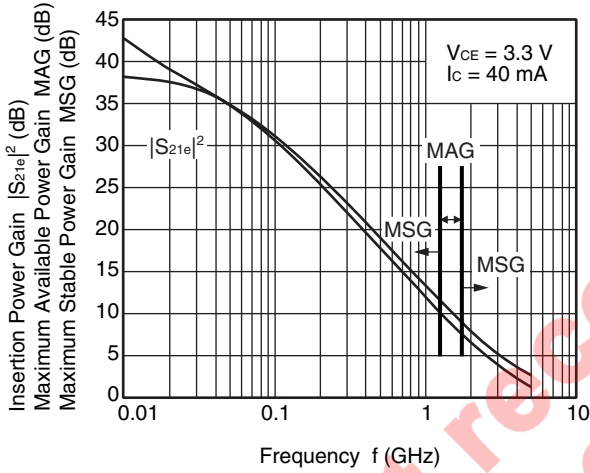
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



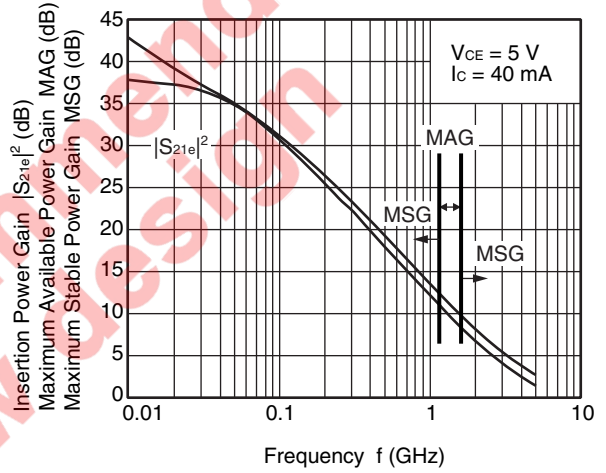
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



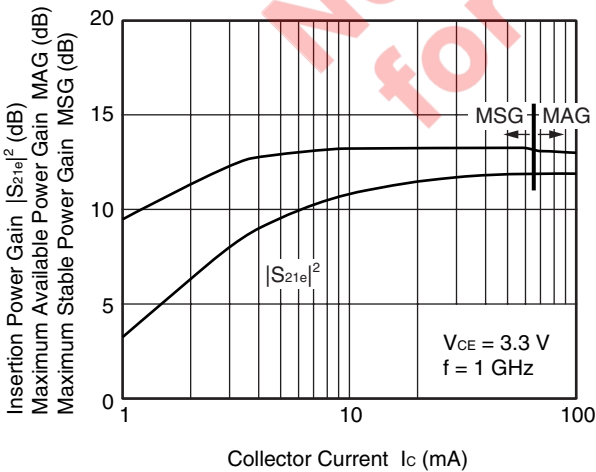
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



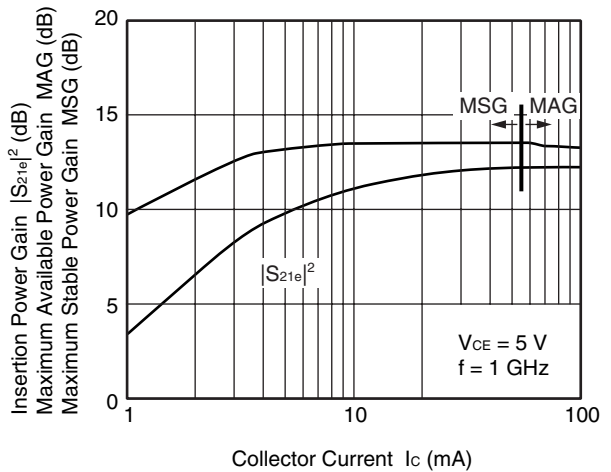
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

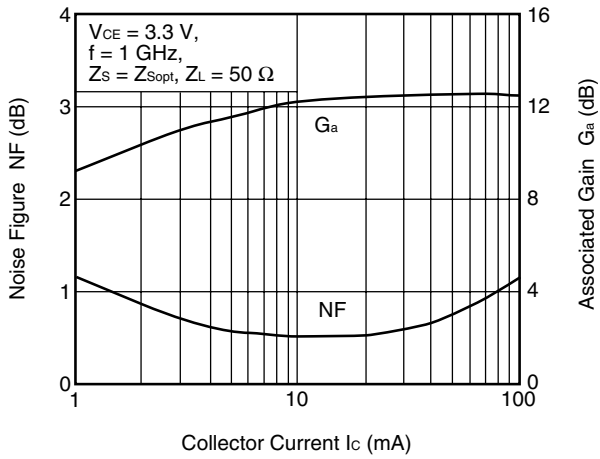


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

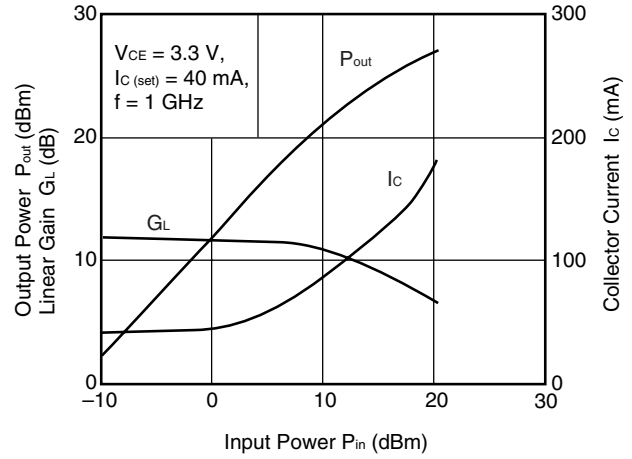


Remark The graphs indicate nominal characteristics.

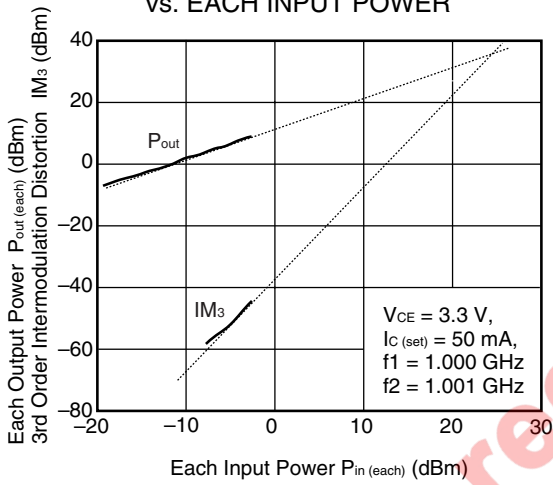
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



OUTPUT POWER, LINEAR GAIN, COLLECTOR CURRENT vs. INPUT POWER



EACH OUTPUT POWER, IM_3 vs. EACH INPUT POWER



Remark The graphs indicate nominal characteristics.

Not recommended for new design

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.

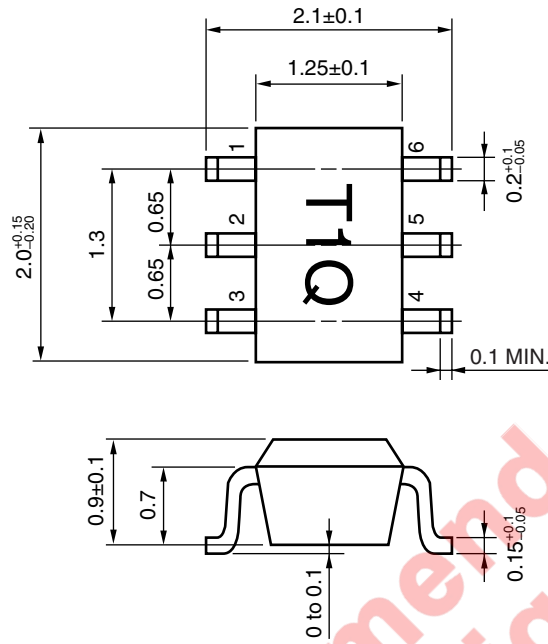
[RF and Microwave] → [Device Parameters]

URL <http://www2.renesas.com/microwave/en/download.html>

Not recommend
for new design

PACKAGE DIMENSIONS

6-PIN SUPER MINIMOLD (M01 PKG) (UNIT: mm)



PIN CONNECTIONS

- | | |
|--------------|--------------|
| 1. Base | 4. N.C. |
| 2. Collector | 5. Collector |
| 3. Emitter | 6. N.C. |

Not recommended for new design

Revision History	NESG3400M01 Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Jul 26, 2011	-	First edition issued

Not recommend
for new design

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