NESG340034

NPN Silicon Germanium RF Transistor

R09DS0023EJ0200
Rev.2.00
Aug 18, 2011

DESCRIPTION

The NESG340034 is an ideal choice for low noise, low distortion amplification.

FEATURES

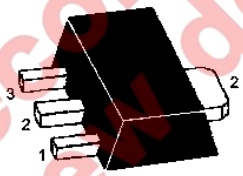
- NF = 0.65 dB TYP. @ V_{CE} = 5 V, I_C = 15 mA, f = 1 GHz
- $P_{o\ (1\ dB)}$ = 24 dBm TYP. @ V_{CE} = 5 V, $I_{C\ (set)}$ = 40 mA, f = 1 GHz
- OIP_3 = 35.5 dBm TYP. @ V_{CE} = 5 V, $I_{C\ (set)}$ = 40 mA, f = 1 GHz
- Maximum stable power gain: MSG =12.0 dB TYP. @ V_{CE} = 5 V, I_C = 40 mA, f = 1 GHz
- SiGe HBT technology (UHS3) : f_T = 10 GHz
- This product is improvement of ESD
- 3-pin power minimold (34 PKG)

APPLICATIONS

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

OUTLINE

RENESAS Package code: 34
(Package name: 3-pin power minimold (34 PKG))



1. Emitter
2. Collector
3. Base

Note: Marking is "ST"

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG340034	NESG340034-A	3-pin power minimold (34 PKG) (Pb-Free)	25 pcs (Non reel)	• Magazine case
NESG340034-T1	NESG340034-T1-A		1 kpcs/reel	• Embossed tape 12 mm wide • Pin 2 face the perforation side of the tape

Remark To order evaluation samples, please contact your nearby sales office.
Unit sample quantity is 25 pcs.

CAUTION

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

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°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}	886	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°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

THERMAL RESISTANCE (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Thermal Resistance from Junction to Ambient Note	Rth_{j-a}	141	°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	–	40	–	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
<R> DC Current Gain	h_{FE} Note1	V_{CE} = 5 V, I_C = 15 mA	200	320	500	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 5 V, I_C = 40 mA, f = 1 GHz	–	10.0	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 5 V, I_C = 40 mA, f = 1 GHz	8.5	10.5	–	dB
Noise Figure (1)	NF1	V_{CE} = 5 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} = 5 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} = 5 V, I_C = 15 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, Z_L = 50 Ω	8.0	10.0	–	dB
Associated Gain (2)	G_a2	V_{CE} = 5 V, I_C = 40 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	11.0	–	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 5 V, I_E = 0, f = 1 MHz	–	1.1	1.3	pF
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 5 V, I_C = 40 mA, f = 1 GHz	10.0	12.0	–	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 5 V, $I_{C\ (set)}$ = 40 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	24.0	–	dBm
Output 3rd Order Intercept Point	OIP_3	V_{CE} = 5 V, $I_{C\ (set)}$ = 40 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.

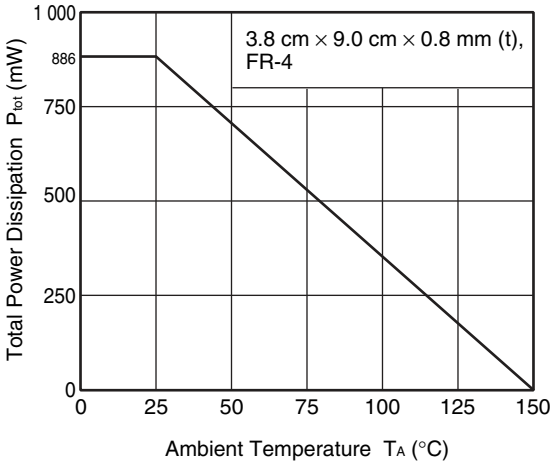
3. MSG = $\left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

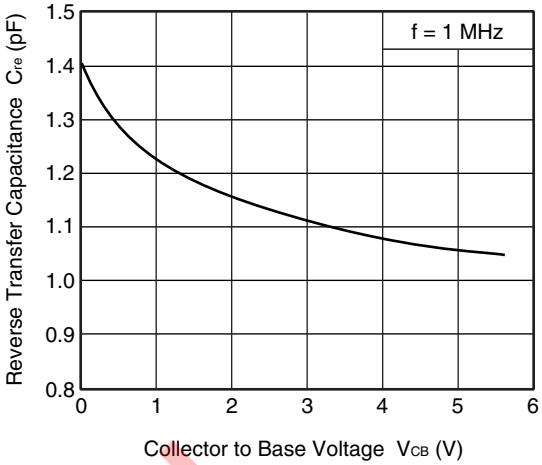
Rank	FB
Marking	ST
h_{FE} Value	200 to 500

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

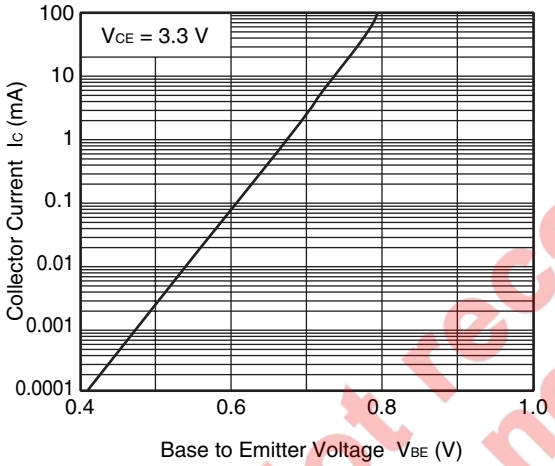
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



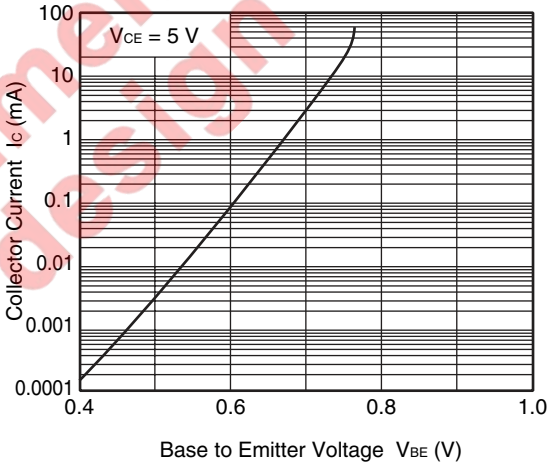
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



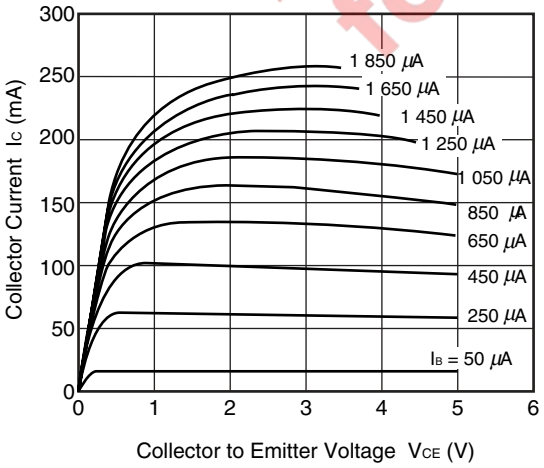
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

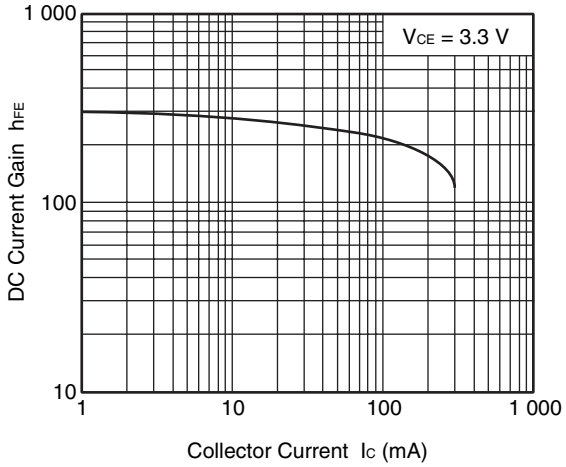


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

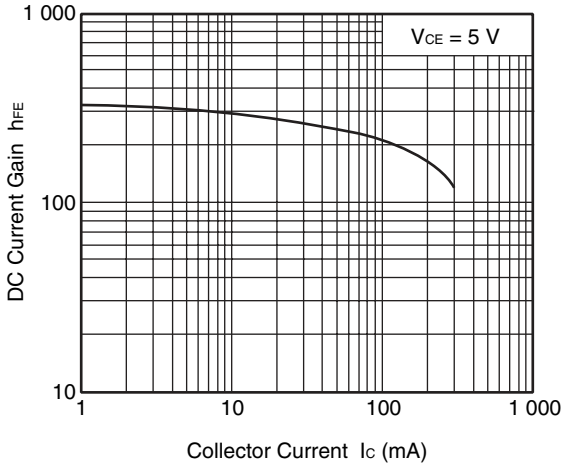


Remark The graphs indicate nominal characteristics.

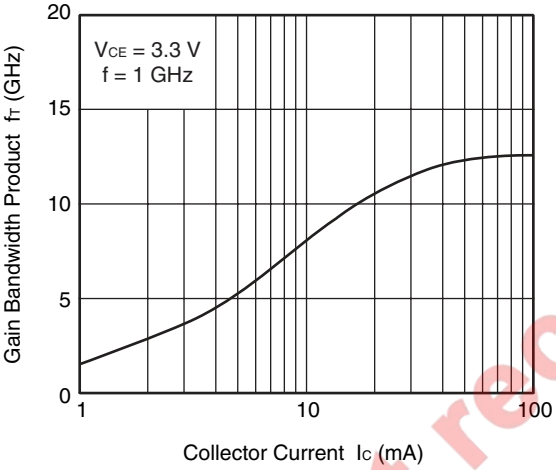
DC CURRENT GAIN vs.
COLLECTOR CURRENT



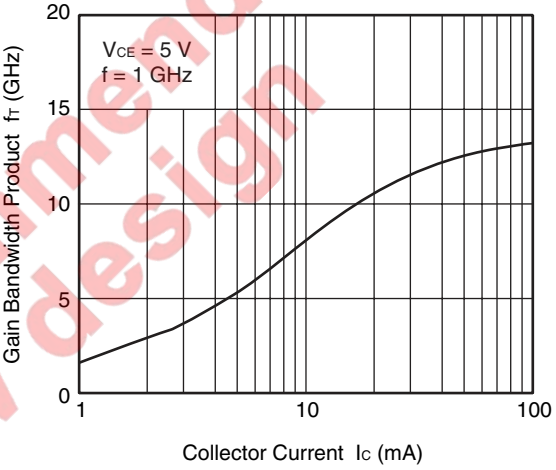
DC CURRENT GAIN vs.
COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

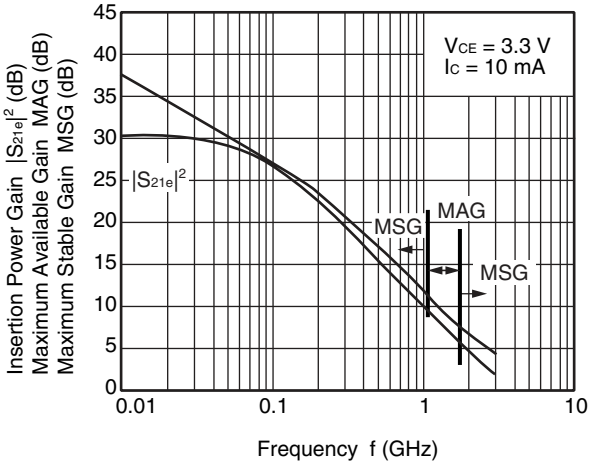


GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

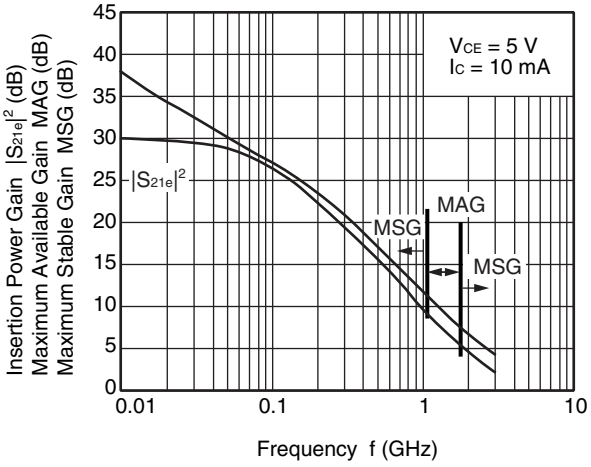


Remark The graphs indicate nominal characteristics.

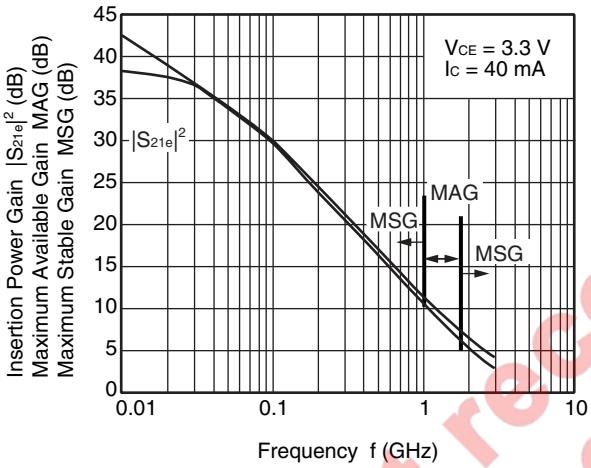
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



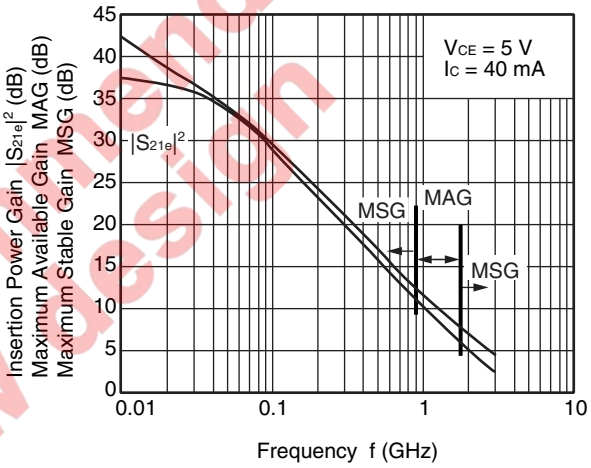
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



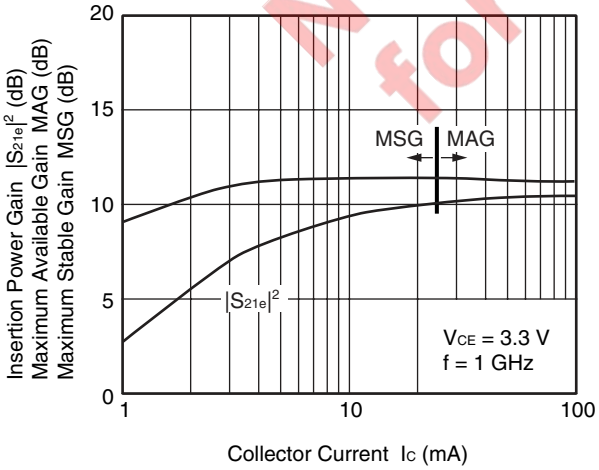
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



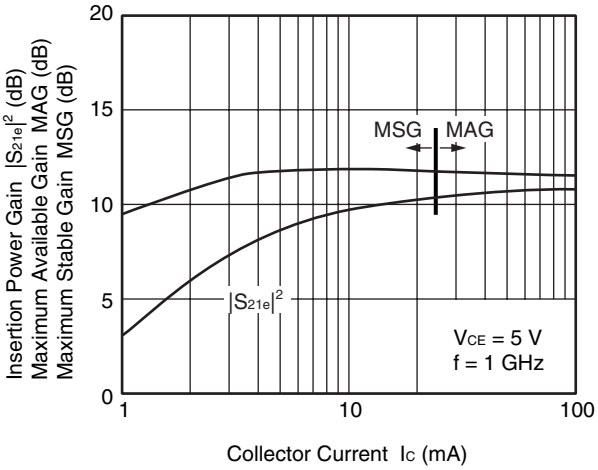
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

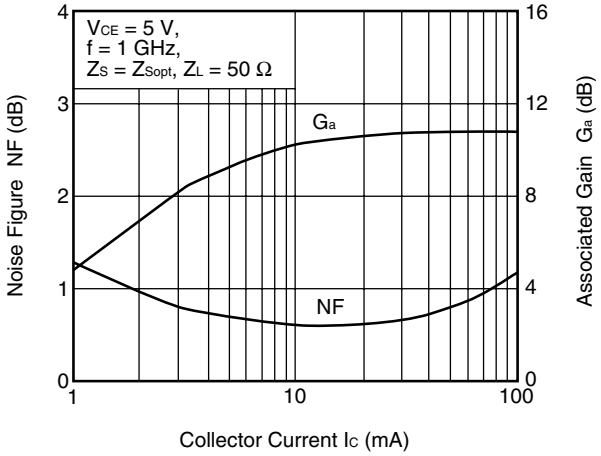


INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT

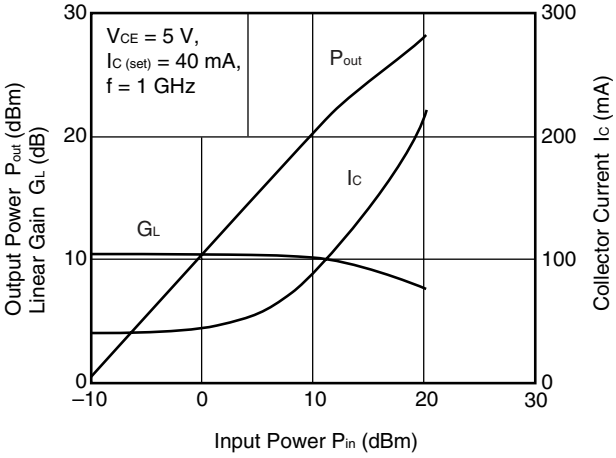


Remark The graphs indicate nominal characteristics.

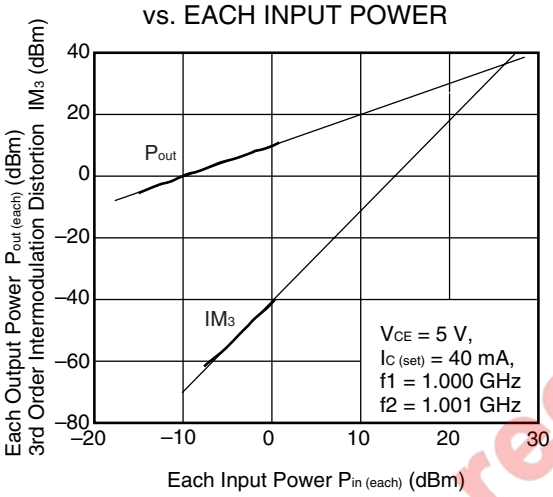
NOISE FIGURE, ASSOCIATED GAIN
vs. COLLECTOR CURRENT



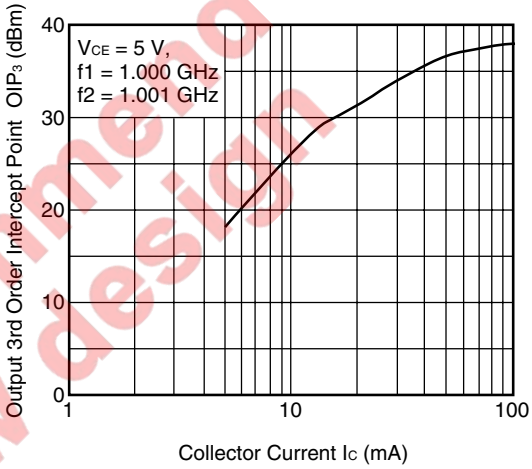
OUTPUT POWER, LINEAR GAIN,
COLLECTOR CURRENT vs. INPUT POWER



EACH OUTPUT POWER, IM3
vs. EACH INPUT POWER



OUTPUT 3RD ORDER INTERCEPT POINT
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

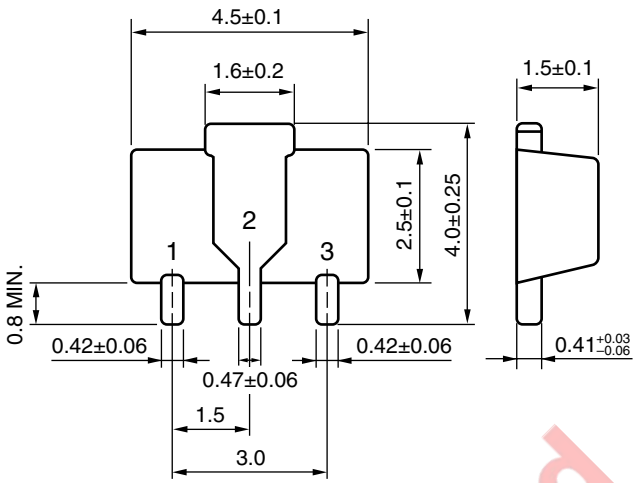
S-PARAMETERS

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

PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (34 PKG) (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Collector
3. Base

Revision History	NESG340034 Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	Jun 27, 2011	–	First edition issued
2.00	Aug 18, 2011	p.3	**ELECTRICAL CHARACTERISTICS** DC Current Gain 400 → 500 (MAX.)

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

Colophon 1.1