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April 1st, 2010 Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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DATA SHEET

NPN SILICON GERMANIUM RF TRANSISTOR **NESG270034**

NPN SIGE RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (2 W) 3-PIN POWER MINIMOLD (34 PKG)

FEATURES

- This product is suitable for medium output power (2 W) amplification
 - $P_{out} = 33.5 \text{ dBm TYP.} @ V_{CE} = 6 \text{ V}, P_{in} = 20 \text{ dBm}, f = 460 \text{ MHz}$
 - $P_{out} = 31.5 \text{ dBm TYP.} @ V_{CE} = 6 \text{ V}, P_{in} = 20 \text{ dBm}, f = 900 \text{ MHz}$
- Using UHS2-HV process (SiGe technology), Vсво (ABSOLUTE MAXIMUM RATINGS) = 25 V
- 3-pin power minimold (34 PKG)

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG270034	NESG270034-AZ	3-pin power minimold (34 PKG) (Pb-Free) ^{№ote}	25 pcs (Non reel)	Magazine case
NESG270034-T1	NESG270034-T1-AZ	0	1 kpcs/reel	 12 mm wide embossed taping Pin 2 (Emitter) face the perforation side of the tape

<R>

Note Contains Lead in the part except the electrode terminals.

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

ABSOLUTE MAXIMUM RATINGS (TA = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	Vсво	25	V
Collector to Emitter Voltage	VCEO	9.2	V
Emitter to Base Voltage	Vebo	2.8	V
Collector Current	lc	750	mA
Total Power Dissipation	Ptot Note	1.9	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	–65 to +150	°C

Note Mounted on 34.2 cm² \times 0.8 mm (t) glass epoxy PWB

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

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The mark <R> shows major revised points.

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

THERMAL RESISTANCE $(T_A = +25^{\circ}C)$

Parameter	Symbol	Ratings	Unit
Termal Resistance from Junction to Ambient ^{№0®}	Rth _{j-a}	65	°C/W

Note Mounted on 34.2 cm² \times 0.8 mm (t) glass epoxy PWB

RECOMMENDED OPERATING RANGE (TA = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Collector to Emitter Voltage	VCE	-	6.0	7.2	V
Collector Current	lc	-	600	750	mA
Input Power ^{Note}	Pin	_	20	23	dBm 🧹

Note Input power under conditions of $V_{\text{CE}} \leq 6.0 \text{ V}$, f = 460 MHz

ELECTRICAL CHARACTERISTICS (TA = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	Ісво	V _{CB} = 9.2 V, I _E = 0 mA	-	-	1	μA
Emitter Cut-off Current	Іево	V _{EB} = 1.0 V, I _C = 0 mA	-	-	1	μA
DC Current Gain		Vce = 3 V, lc = 100 mA	80	120	180	-
RF Characteristics						
Linner Gain (1)	G∟	$V_{\text{CE}} = 6 \text{ V}, \text{ Ic } (\text{set}) = 30 \text{ mA (RF OFF)},$	17.5	19.5	_	dB
		$f = 460 \text{ MHz}, P_{in} = 0 \text{ dBm}$				
Linner Gain (2)	G∟	$V_{CE} = 6 V$, Ic (set) = 30 mA (RF OFF),	-	15	_	dB
		$f = 900 \text{ MHz}, P_{in} = 0 \text{ dBm}$				
Output Power (1)	Pout	$V_{\text{CE}} = 6 \text{ V}, \text{ Ic } (\text{set}) = 30 \text{ mA (RF OFF)},$	31.5	33.5	_	dBm
		f = 460 MHz, P _{in} = 20 dBm				
Output Power (2)	Pout	Vce = 6 V, Ic (set) = 30 mA (RF OFF),		31.5	_	dBm
		f = 900 MHz, Pin = 20 dBm				
Collector Efficiency (1)	ηc	$V_{CE} = 6 V$, $I_{C (set)} = 30 mA (RF OFF)$,		60	_	%
		f = 460 MHz, Pin = 20 dBm				
Collector Efficiency (2)	ηc	Vce = 6 V, Ic (set) = 30 mA (RF OFF),		50	_	%
		f = 900 MHz, Pin = 20 dBm				

hfe CLASSIFICATION

Note Pulsem	easurement: PW CATION	≤ 350 <i>μ</i> s, Duty Cycle ≤ 2%
Rank	FB	
Marking	SQ	
hfe Value	80 to 180	
		0





Remark The graph indicates nominal characteristics.



Remark The graph indicates nominal characteristics.



Remark The graph indicates nominal characteristics.

S-PARAMETERS

S-parameters/Noise parameters are provided on our web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

Click here to download S-parameters.

 $[\text{RF and Microwave}] \rightarrow [\text{Device Parameters}]$

URL http://www.ncsd.necel.com/microwave/index.html

PA EVALUATION CIRCUIT TYPICAL CHARACTERISTICS



Remark The graph indicates nominal characteristics.

EVALUATION CIRCUIT (f = 460 MHz)



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

EVALUATION BOARD (f = 460 MHz)



Notes

- 1. 38×38 mm, t = 0.8 mm double sided copper clad glass epoxy PWB.
- 2. Back side: GND pattern
- 3. Solder gold plated on pattern
- 4. oO: Through holes

COMPONENT LIST

Component	Maker	Value	Size (TYPE)	Purpose
C1	Murata	11 pF	1005	Input DC Block/Input RF Matching
C2	Murata	9.5 pF	1005	Input RF Matching
C3	Murata	39 pF	1005	Input DC Block/Output RF Matching
C4	Murata	10 000 pF	1005	RF GND
C5	Murata	10 000 pF	1005	RF GND
L1	Toko	390 nH	2012	RF Block/Input RF Matching
L2	Toko	47 nH	1608	RF Block/Output RF Matching
L3	Toko	5.6 nH	2012	Input RF Matching
L4	Toko	5.1 nH	1608	Output RF Matching
R1	SSM	15 Ω	1005	Improve Stability
R2	SSM	10 Ω	1005	Improve Stability

PACKAGE DIMENSIONS

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



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