

NE461M02 / 2SC5337 JEITA Part No.

Data Sheet

NPN Silicon RF Transistor for High-Frequency
 Low Distortion Amplifier 4-Pin Power Minimold

R09DS0047EJ0300
 Rev.3.00
 Sep 14, 2012

FEATURES

- Low distortion: $IM_2 = 59.0$ dB TYP., $IM_3 = 82.0$ dB TYP. @ $V_{CE} = 10$ V, $I_C = 50$ mA
- Low noise
 $NF = 1.5$ dB TYP. @ $V_{CE} = 10$ V, $I_C = 50$ mA, $f = 500$ MHz
 $NF = 2.0$ dB TYP. @ $V_{CE} = 10$ V, $I_C = 50$ mA, $f = 1$ GHz
- 4-pin power minimold package with improved gain from the NE46134 / 2SC4536

<R> ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NE461M02 2SC5337	NE461M02-AZ 2SC5337-AZ	4-pin power minimold (Pb-Free) Note	25 pcs (Non reel)	• Magazine case
NE461M02-T1 2SC5337-T1	NE461M02-T1-AZ 2SC5337-T1-AZ		1 kpcs/reel	• 12 mm wide embossed taping • Collector face the perforation side of the tape

Note Contains Lead in the part except the electrode terminals.

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

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	30	V
Collector to Emitter Voltage	V_{CEO}	15	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	250	mA
Total Power Dissipation	P_{tot} Note	2.0	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Note Mounted on $16\text{ cm}^2 \times 0.7$ mm (t) ceramic substrate (Copper plating)

CAUTION

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

The mark <R> shows major revised points.

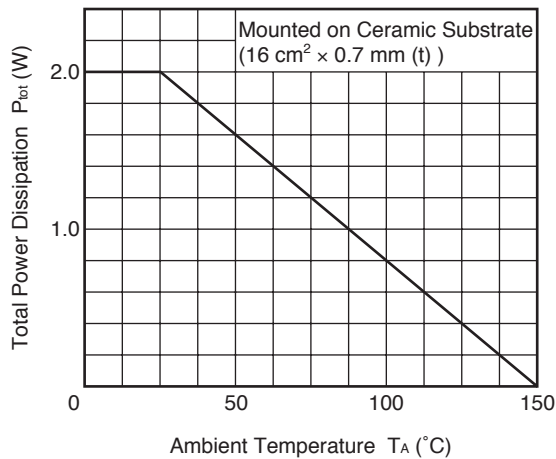
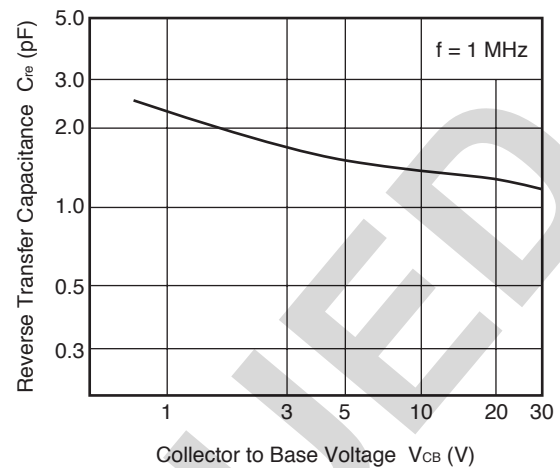
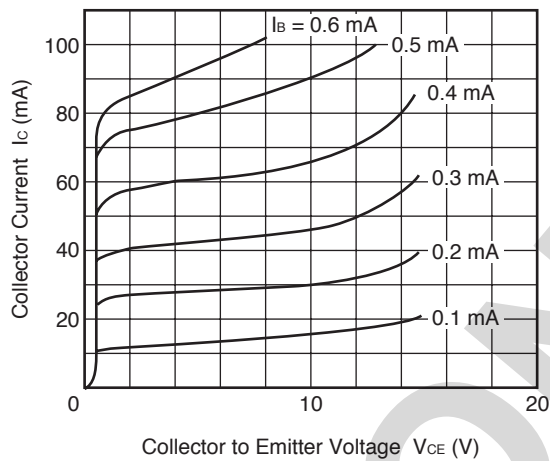
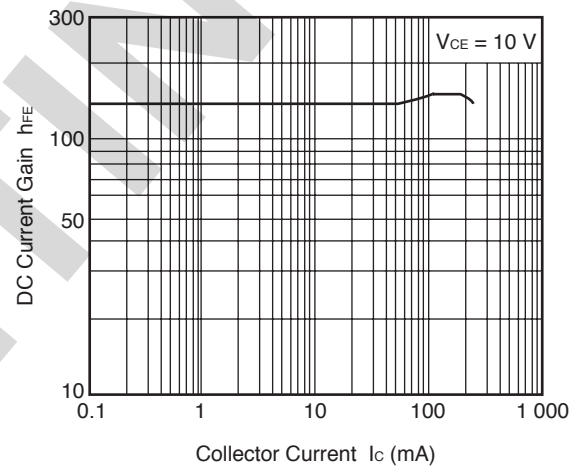
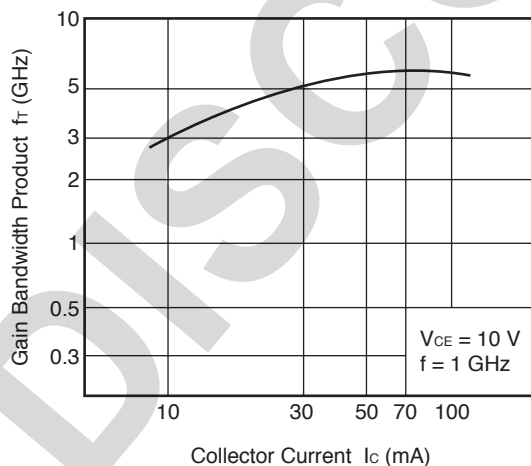
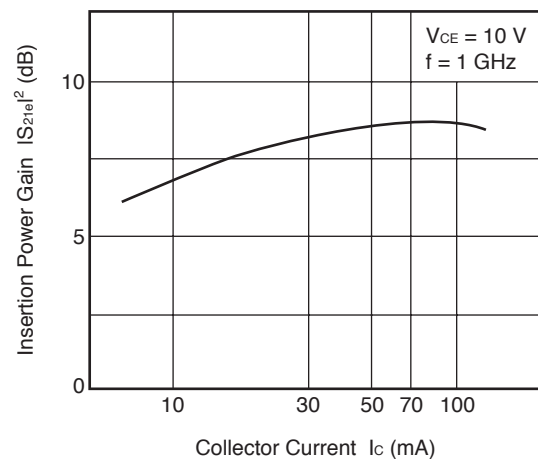
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

<R> ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$)

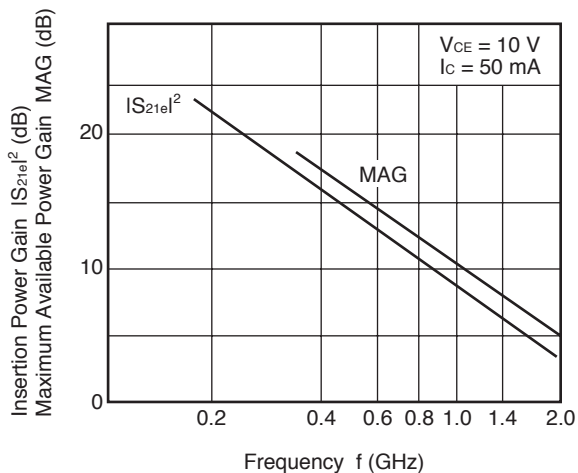
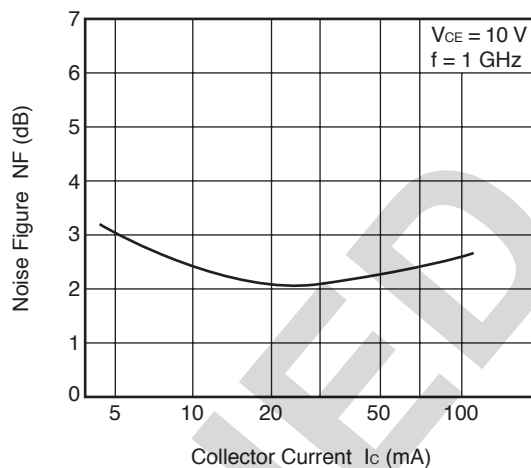
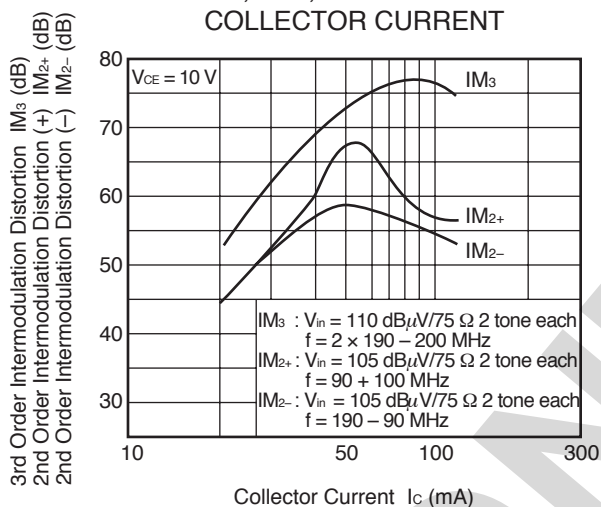
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	$V_{CB} = 20\text{ V}, I_E = 0$	–	0.01	5.0	μA
Emitter Cut-off Current	I_{EBO}	$V_{BE} = 2\text{ V}, I_C = 0$	–	0.03	5.0	μA
DC Current Gain	h_{FE} ^{Note 1}	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}$	60	120	200	–
RF Characteristics						
Insertion Power Gain	S_{21e} ²	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}, f = 1\text{ GHz}$	7.0	8.3	–	dB
Noise Figure (1)	NF ^{Note 2}	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}, f = 500\text{ MHz}$	–	1.5	3.5	dB
Noise Figure (2)	NF ^{Note 2}	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}, f = 1\text{ GHz}$	–	2.0	3.5	dB
2nd Order Intermodulation Distortion	IM_2	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}, R_S = R_L = 75\ \Omega$, $V_{in} = 105\text{ dB}\mu\text{V}/75\ \Omega, f_1 = 190\text{ MHz}$, $f_2 = 90\text{ MHz}, f = f_1 - f_2$	–	59.0	–	dB
3rd Order Intermodulation Distortion	IM_3	$V_{CE} = 10\text{ V}, I_C = 50\text{ mA}, R_S = R_L = 75\ \Omega$, $V_{in} = 105\text{ dB}\mu\text{V}/75\ \Omega, f_1 = 190\text{ MHz}$, $f_2 = 200\text{ MHz}, f = 2 \times f_1 - f_2$	–	82.0	–	dB

Notes 1. Pulse measurement: $PW \leq 350\ \mu\text{s}$, Duty Cycle $\leq 2\%$ **2.** $R_S = R_L = 50\ \Omega$, tuned<R> h_{FE} CLASSIFICATION

Rank	QR/YQR	QS/YQS
Marking	QR	QS
h_{FE} Value	60 to 120	100 to 200

TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = +25^\circ\text{C}$)TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATUREREVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGECOLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGEDC CURRENT GAIN vs.
COLLECTOR CURRENTGAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENTINSERTION POWER GAIN
vs. COLLECTOR CURRENT

Remark The graphs indicate nominal characteristics.

**INSERTION POWER GAIN, MAG
vs. FREQUENCY****NOISE FIGURE vs.
COLLECTOR CURRENT****IM₃, IM₂₊, IM₂₋ 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 form (S2P) that enables direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.

Click here to download S-parameters.

[Products] → [RF Devices] → [Device Parameters]

URL <http://www.renesas.com/products/microwave/>

Technical drawing of a mechanical part, showing a top view and a side view. The top view includes dimensions: 4.5±0.1, 2.1, 1.6, 0.8, 0.3, 2.45±0.1, 0.1, 0.8 MIN., 0.85, 1.55, 3.95±0.25, 0.42±0.06, 1.5, 3.0, 0.46±0.06, and 0.25±0.02. The side view shows a profile with a width of 1.5±0.1. The part is labeled with 'C' and 'E'.

E: Emitter
C: Collector
B: Base

Revision History	NE461M02 / 2SC5337 Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Mar 01, 1996	–	First edition issued
2.00	Aug 28, 2001	–	Second edition issued
2.10	Sep 06, 2001	–	Second V1 edition issued
3.00	Sep 14, 2012	Throughout	The company name is changed to Renesas Electronics Corporation.
		p.1	Modification of ORDERING INFORMATION
		p.2	Modification of ELECTRICAL CHARACTERISTICS
		p.2	Modification of h_{FE} CLASSIFICATION
		p.4	Modification of method for obtaining S-parameters

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