NE202930

Silicon NPN Epitaxial High Frequency Transistor

Data Sheet
R09DS0003EJ0100
Rev.1.00
Jul 14, 2010

FEATURES

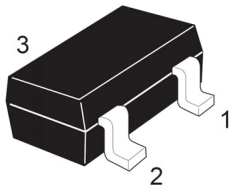
- High transition frequency f_T = 11 GHz TYP.
- Ideal for low noise and low distortion amplification
- Suitable for equipments of low collector voltage (Less than 5 V)
- Suitable for up to 1 GHz applications

APPLICATIONS

- LNA (Low Noise Amplifier) or power splitter for digital-TV

OUTLINE

RENESAS Package code: 30
(Package name: 3-pin super minimold (30 PKG))



1. Emitter
2. Base
3. Collector

Note: Marking is "R7D"

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
NE202930-T1	NE202930-T1-A	3-pin super minimold (30 PKG) (Pb-Free)	R7D	• Embossed tape 8 mm wide • Pin 3 face the perforation side of the tape • Qty 3 kpcs/reel

Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample order: NE202930-A

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	9	V
Collector to Emitter Voltage (Base Short)	V_{CES}	9	V
Collector to Emitter Voltage (Base Open)	V_{CEO}	6	V
Emitter to Base Voltage	V_{EBO}	2	V
Collector Current	I_C	100	mA
Total Power Dissipation Note	P_{tot}	150	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note: Free air

CAUTION

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

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

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} = 1 V, I_C = 0	–	–	100	nA
DC Current Gain	h_{FE} Note1	V_{CE} = 5 V, I_C = 5 mA	85	140	205	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 5 V, I_C = 30 mA, f = 1 GHz	–	11.0	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 5 V, I_C = 30 mA, f = 1 GHz	11.5	13.5	–	dB
Noise Figure (1)	NF1	V_{CE} = 5 V, I_C = 5 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, Z_L = 50 Ω	–	1.15	1.5	dB
Noise Figure (2)	NF2	V_{CE} = 5 V, I_C = 30 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	1.5	–	dB
Associated Gain (1)	G_a1	V_{CE} = 5 V, I_C = 5 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, Z_L = 50 Ω	10.0	12.0	–	dB
Associated Gain (2)	G_a2	V_{CE} = 5 V, I_C = 30 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	13.5	–	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 5 V, I_E = 0, f = 1 MHz	–	0.6	0.8	pF
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 5 V, I_C = 30 mA, f = 1 GHz	13.5	15.5	–	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 5 V, $I_{C\ (set)}$ = 30 mA, f = 1 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	19	–	dBm
Output 3rd Order Intercept Point	OIP_3	V_{CE} = 5 V, $I_{C\ (set)}$ = 30 mA, f = 1 GHz, Δf = 1 MHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	–	32	–	dBm

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

2. Collector to base capacitance when the emitter grounded.

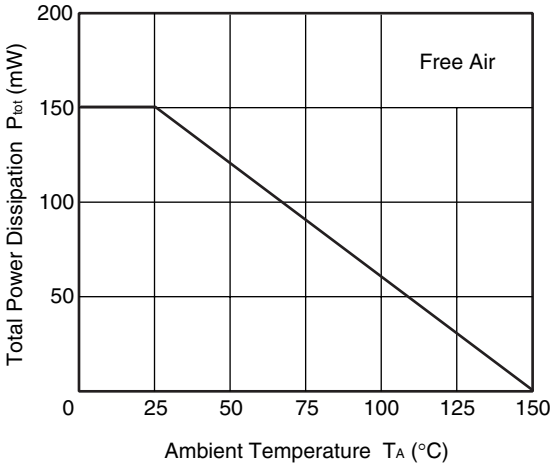
3. MSG = $\left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

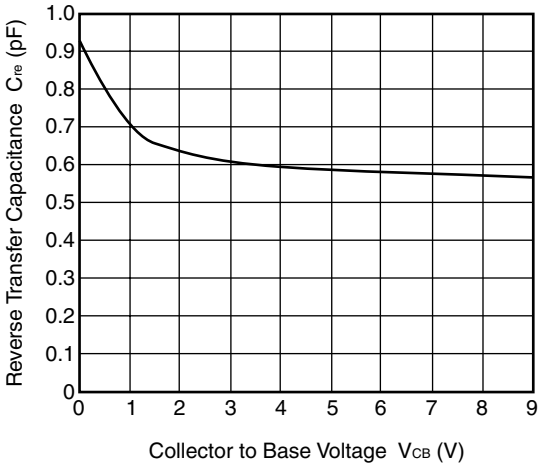
Rank	YFB
Marking	R7D
h_{FE} Value	85 to 205

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

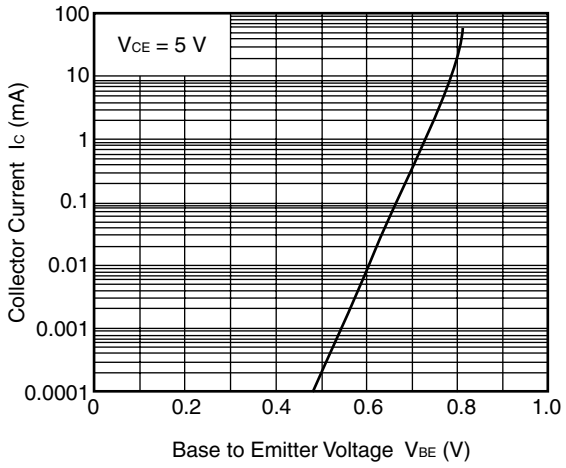
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



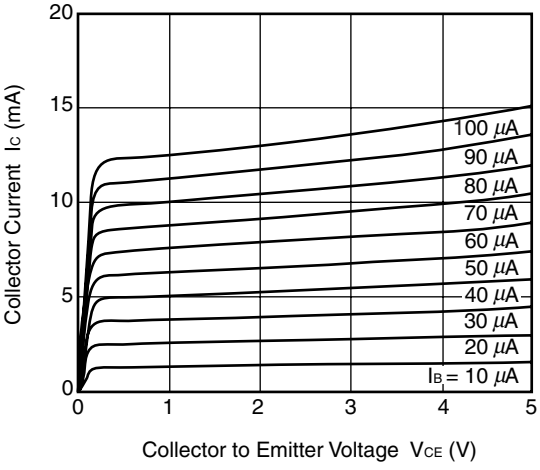
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



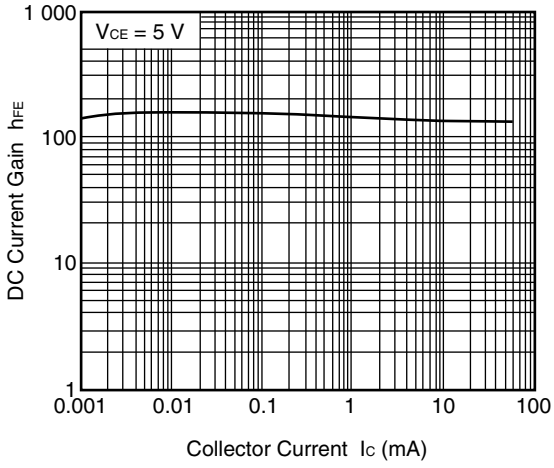
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



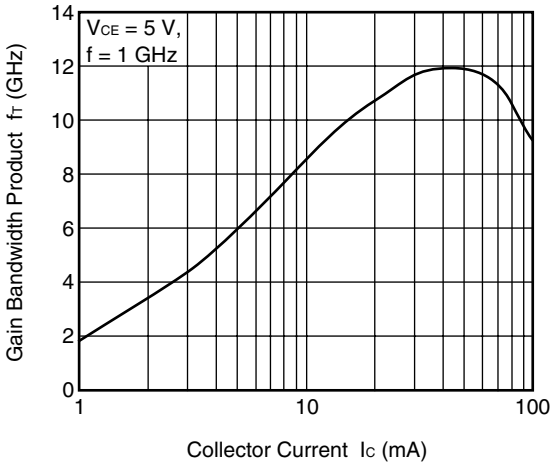
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT

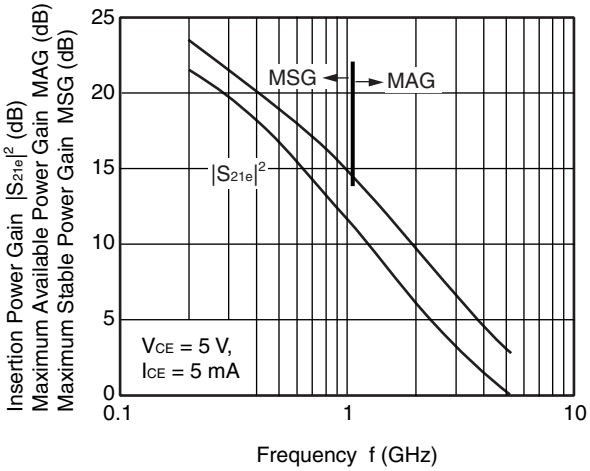


GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

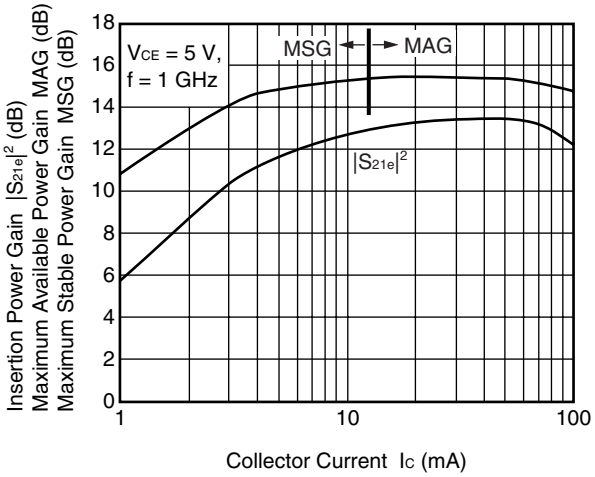


Remark The graphs indicate nominal characteristics.

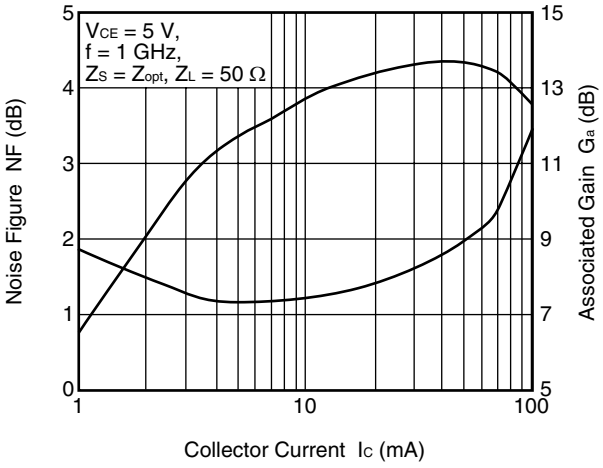
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



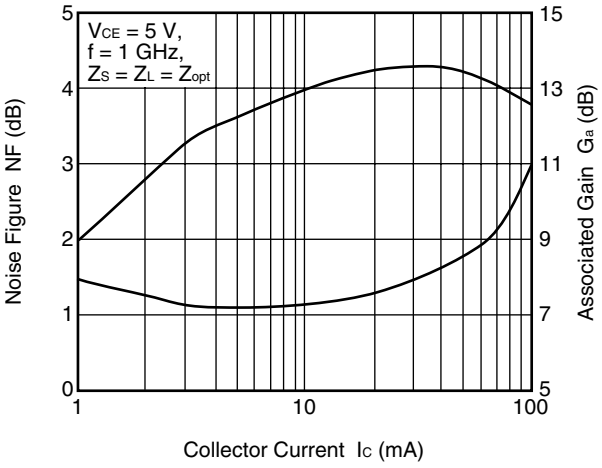
INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



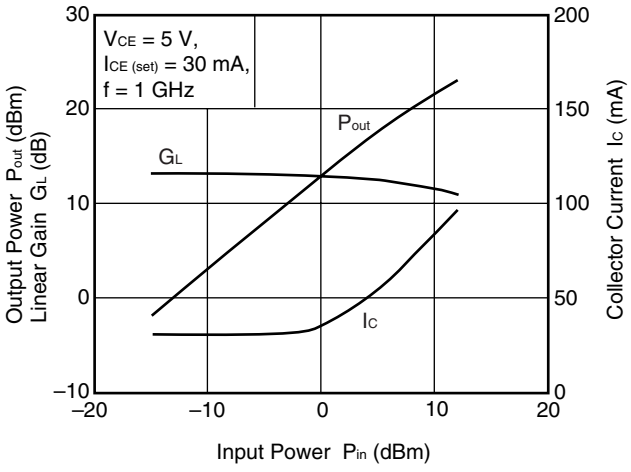
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



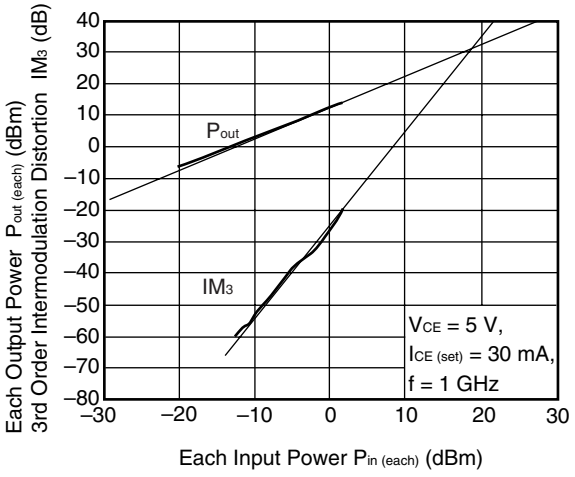
NOISE FIGURE, ASSOCIATED GAIN vs. COLLECTOR CURRENT



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



EACH OUTPUT POWER, IM3 vs. EACH INPUT POWER



Remark The graphs indicate nominal characteristics.

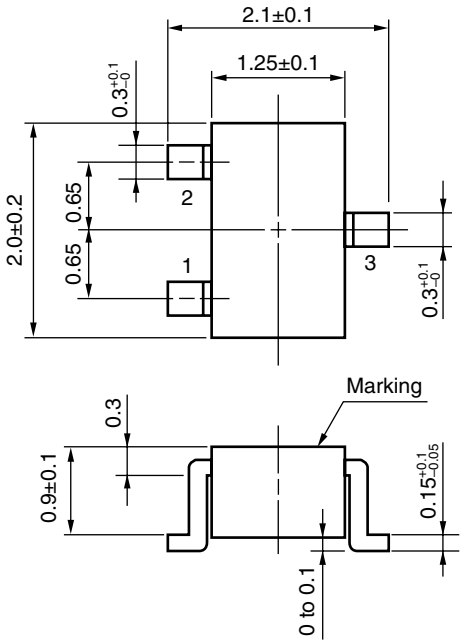
S-PARAMETERS

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 SUPER MINIMOLD (30 PKG) (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

Revision History	NE202930 Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	Jul 14, 2010	–	First edition issued