To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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

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NPN SILICON RF TRANSISTOR
2SC3357

NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION 3-PIN POWER MINIMOLD

FEATURES

- Low noise and high gain

★ NF = 1.1 dB TYP., G_a = 7.5 dB TYP. @ V_{CE} = 10 V, I_C = 7 mA, f = 1 GHz

NF = 1.8 dB TYP., G_a = 9.0 dB TYP. @ V_{CE} = 10 V, I_C = 40 mA, f = 1 GHz

★ • High power gain : MAG = 10 dB TYP. @ I_C = 40 mA, f = 1 GHz

- Large P_{tot} : P_{tot} = 1.2 W (Mounted on 16 $cm^2 \times 0.7$ mm (t) ceramic substrate)
- Small package : 3-pin power minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC3357	25 pcs (Non reel)	• 12 mm wide embossed taping
2SC3357-T1	1 kpcs/reel	• Collector face the perforation side of the tape

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

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_{tot} Note	1.2	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Note Mounted on 16 $cm^2 \times 0.7$ mm (t) ceramic substrate

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

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Date Published January 2003 CP(K)
Printed in Japan

The mark ★ shows major revised points.

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THERMAL RESISTANCE

Parameter	Symbol	Value	Unit
Junction to Ambient Resistance	$R_{th\ (j\text{-}a)}$ Note	62.5	°C/W

Note Mounted on 16 $cm^2 \times 0.7$ mm (t) ceramic substrate

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	V_{CB} = 10 V, I_E = 0 mA	–	–	1.0	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1.0 V, I_C = 0 mA	–	–	1.0	μA
DC Current Gain	h_{FE} Note 1	V_{CE} = 10 V, I_C = 20 mA	50	120	250	–
RF Characteristics						
Gain Bandwidth Product	f_T	V_{CE} = 10 V, I_C = 20 mA	–	6.5	–	GHz
Insertion Power Gain	$\lvert S_{21e} \rvert^2$	V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz	–	9.0	–	dB
Noise Figure (1)	NF	V_{CE} = 10 V, I_C = 7 mA, f = 1 GHz	–	1.1	–	dB
Noise Figure (2)	NF	V_{CE} = 10 V, I_C = 40 mA, f = 1 GHz	–	1.8	3.0	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 10 V, I_E = 0 mA, f = 1 MHz	–	0.65	1.0	pF

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

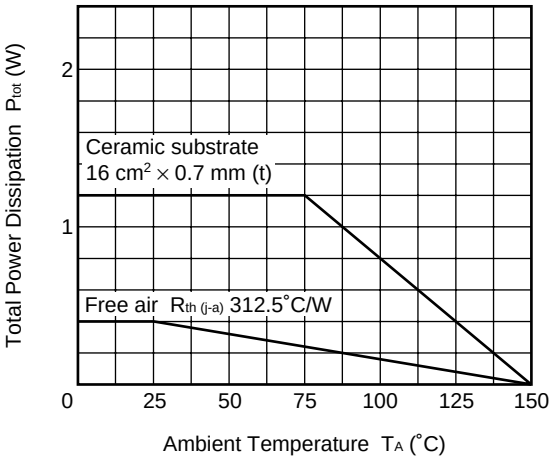
2. The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h_{FE} CLASSIFICATION

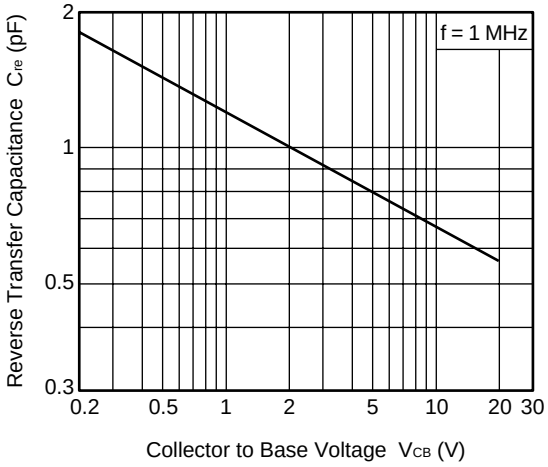
Rank	RH	RF	RE
Marking	RH	RF	RE
h_{FE} Value	50 to 100	80 to 160	125 to 250

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

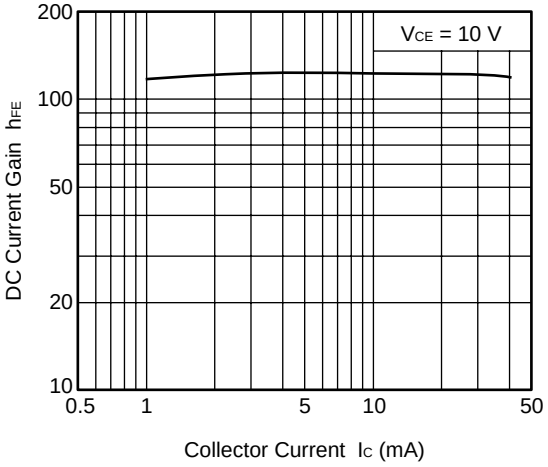
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



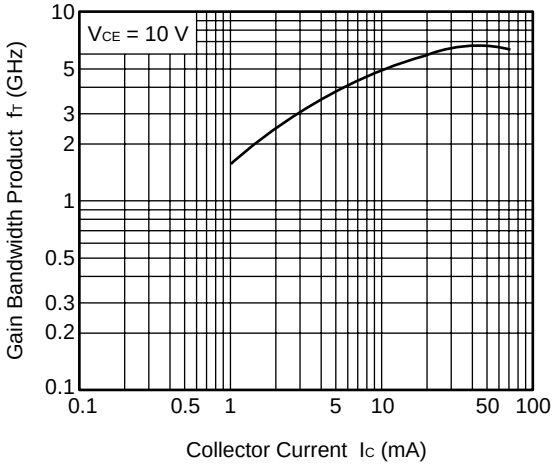
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



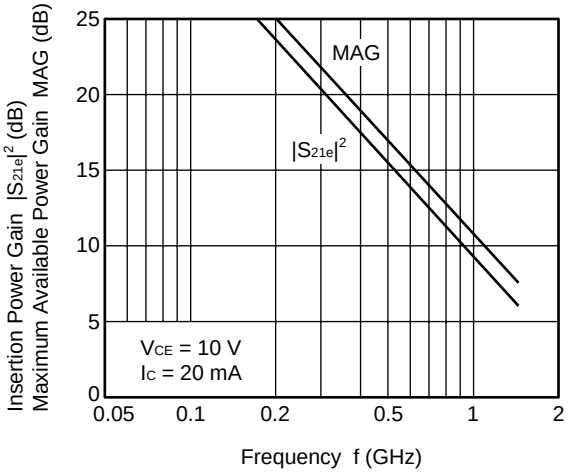
DC CURRENT GAIN vs. COLLECTOR CURRENT



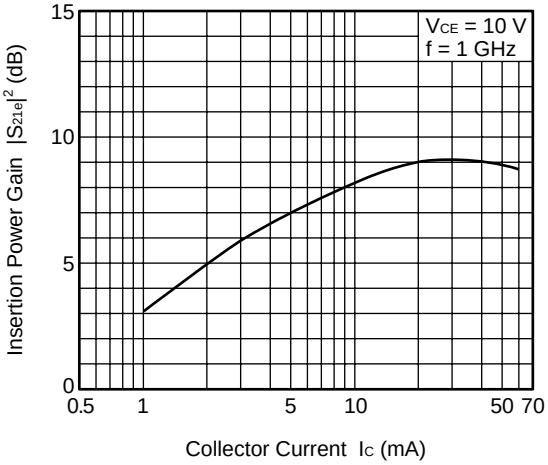
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



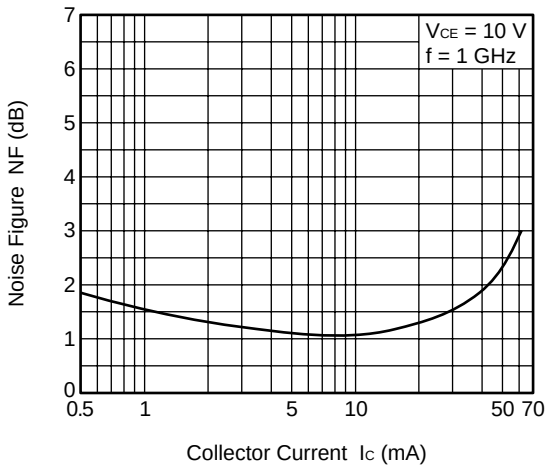
INSERTION POWER GAIN, MAG vs. FREQUENCY



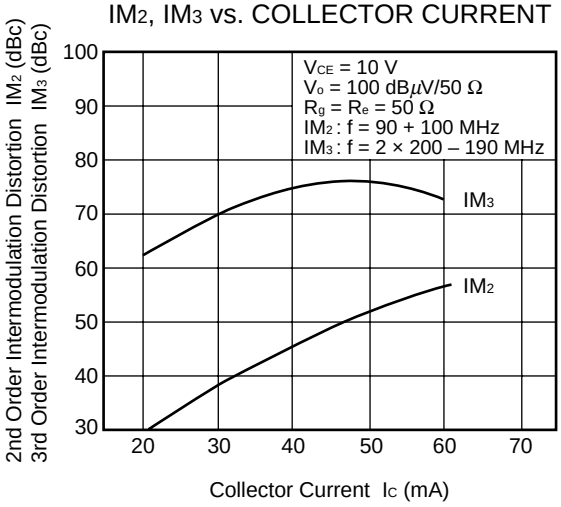
INSERTION POWER GAIN vs. COLLECTOR CURRENT



NOISE FIGURE vs.
COLLECTOR CURRENT



IM2, IM3 vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

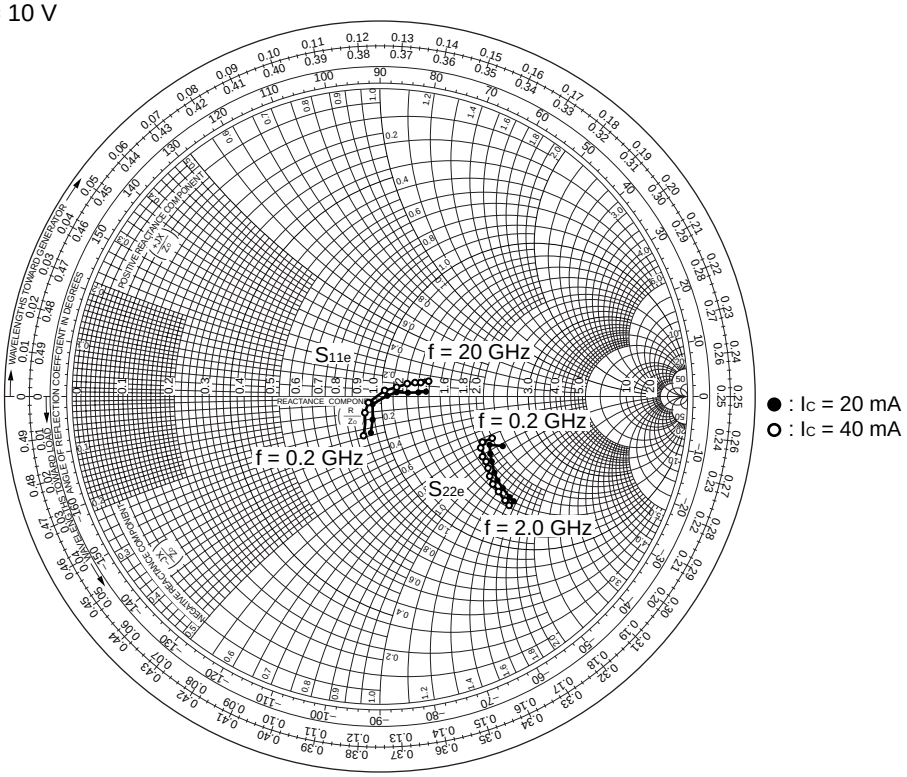
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

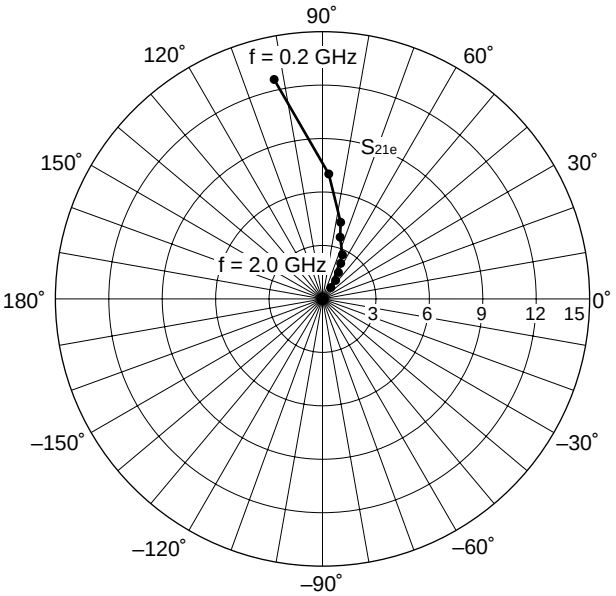
URL http://www.csd-nec.com/

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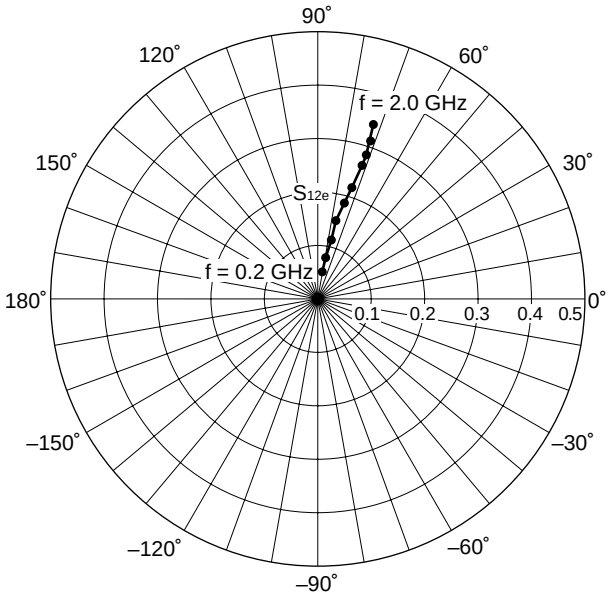
S_{11e}, S_{22e}-FREQUENCY
CONDITION : V_{CE} = 10 V



S_{21e}-FREQUENCY
CONDITION : V_{CE} = 10 V, I_C = 20 mA

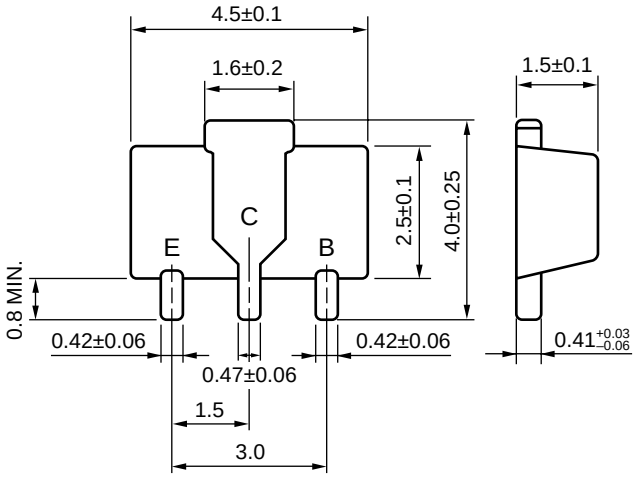


S_{12e}-FREQUENCY
CONDITION : V_{CE} = 10 V, I_C = 20 mA



★ **PACKAGE DIMENSIONS**

3-PIN POWER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

E : Emitter
C : Collector (Fin)
B : Base

(IEC : SOT-89)

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