

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 $16\text{ cm}^2 \times 0.7$ mm (t) ceramic substrate)
- Small package : 3-pin power minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC3357	25 pcs (Non reel)	<ul style="list-style-type: none"> • 12 mm wide embossed taping • Collector face the perforation side of the tape
2SC3357-T1	1 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.
The 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}	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	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

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

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

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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

THERMAL RESISTANCE

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

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

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

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

Notes 1. Pulse measurement: $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

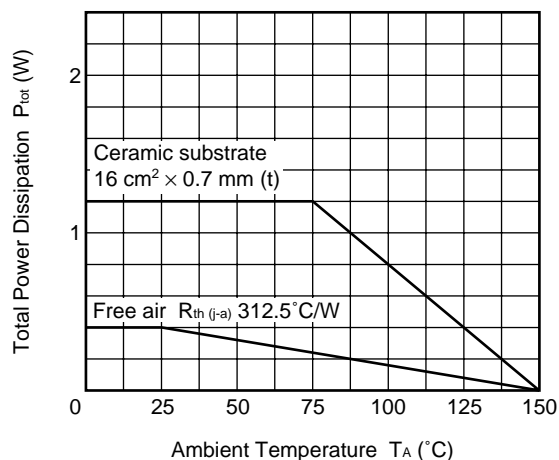
2. The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h_{FE} CLASSIFICATION

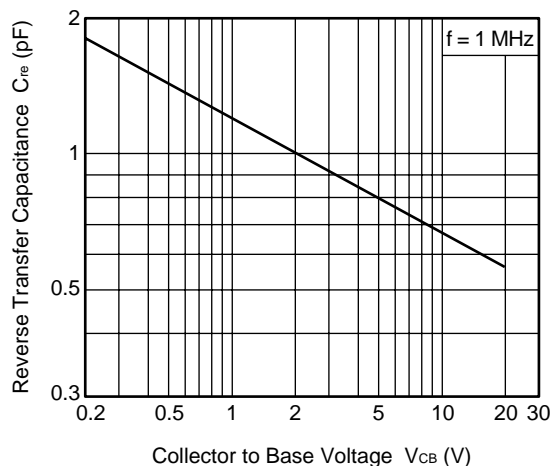
Rank	RH	RF	RE
Marking	RH	RF	RE
h_{FE} Value	50 to 100	80 to 160	125 to 250

★ TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise specified)

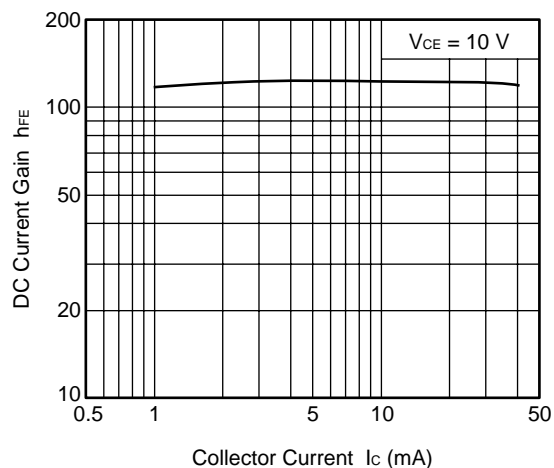
TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



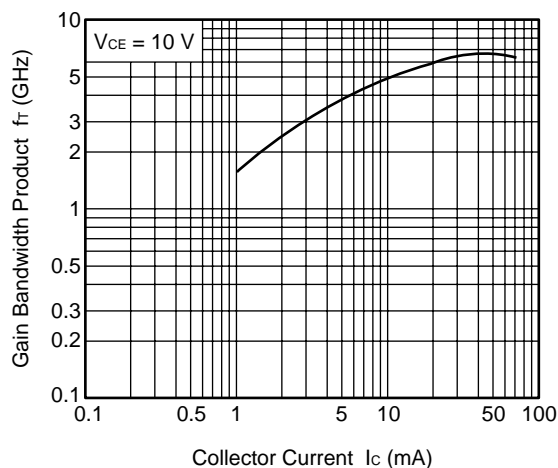
REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



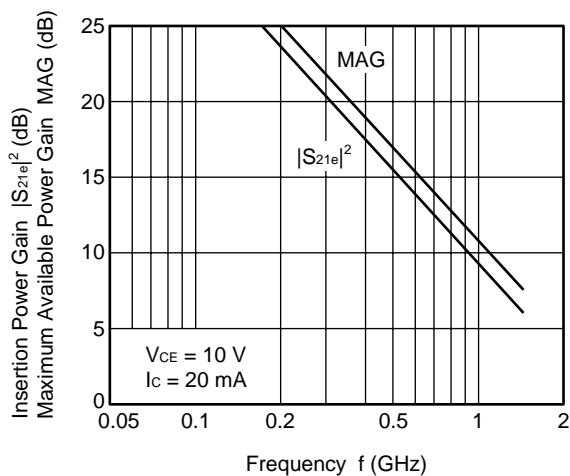
DC CURRENT GAIN vs.
COLLECTOR CURRENT



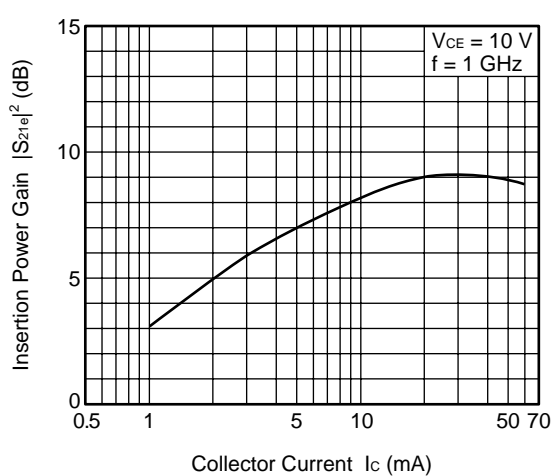
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT

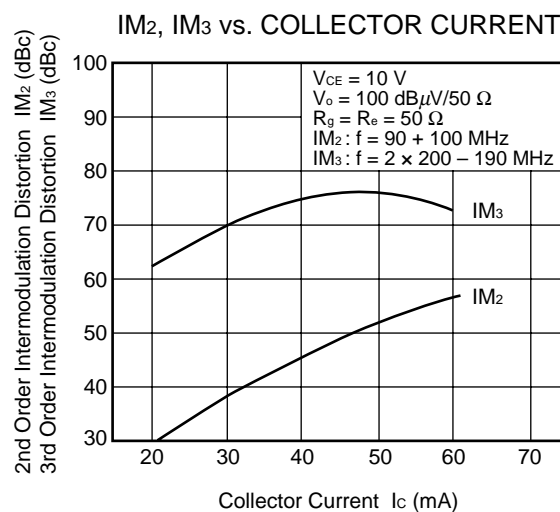
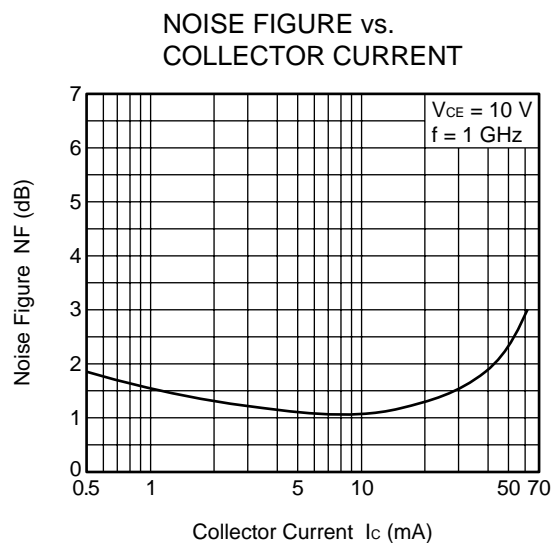


INSERTION POWER GAIN, MAG
vs. FREQUENCY



INSERTION POWER GAIN
vs. COLLECTOR CURRENT





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.

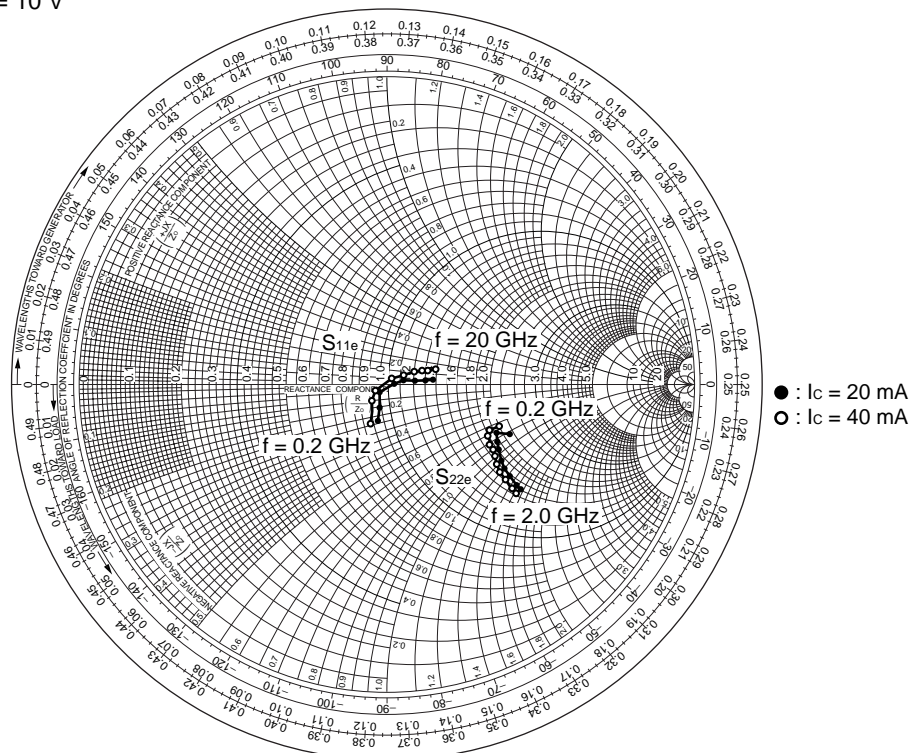
[RF and Microwave] → [Device Parameters]

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

★ SMITH CHART

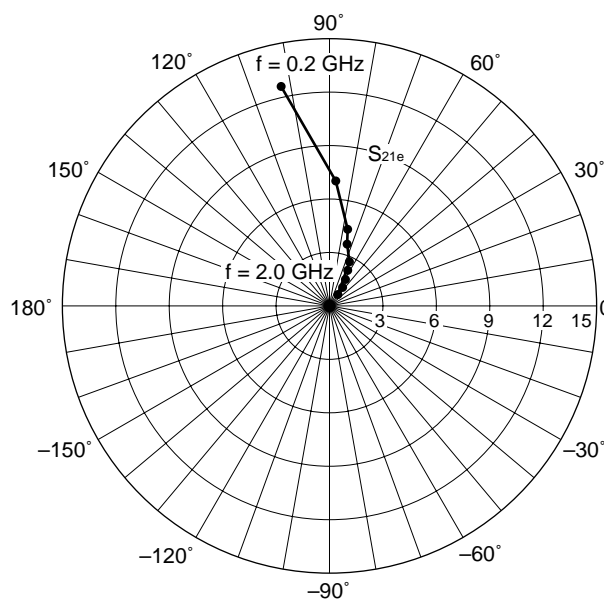
S_{11e} , S_{22e} -FREQUENCY

CONDITION : $V_{CE} = 10\text{ V}$



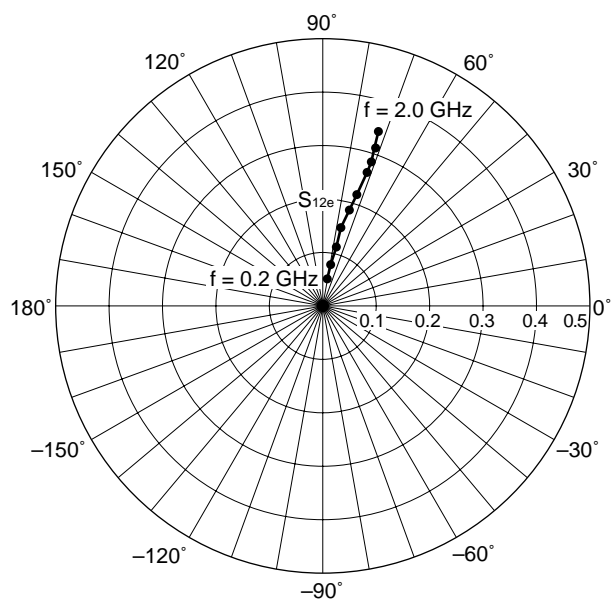
S_{21e} -FREQUENCY

CONDITION : $V_{CE} = 10\text{ V}$, $I_c = 20\text{ mA}$



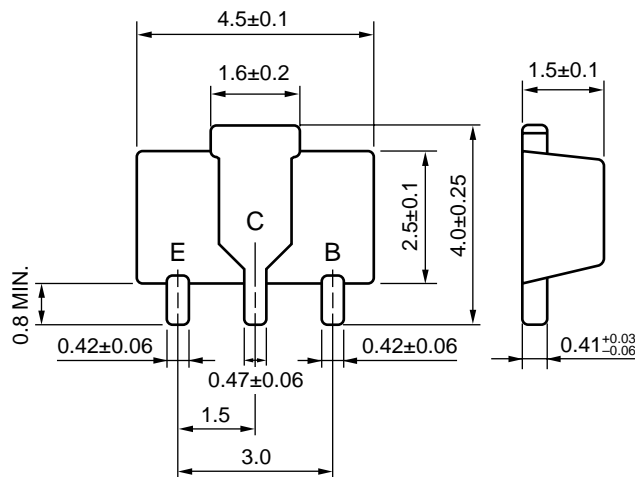
S_{12e} -FREQUENCY

CONDITION : $V_{CE} = 10\text{ V}$, $I_c = 20\text{ mA}$



★ PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

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

(IEC : SOT-89)

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