

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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., Ga = 7.5 dB TYP. @ V_{CE} = 10 V, I_c = 7 mA, f = 1 GHz
 NF = 1.8 dB TYP., Ga = 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 cm² × 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°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 cm² × 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 cm² × 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}	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}$	–	–	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: $PW \leq 350\ \mu s$, Duty Cycle $\leq 2\%$

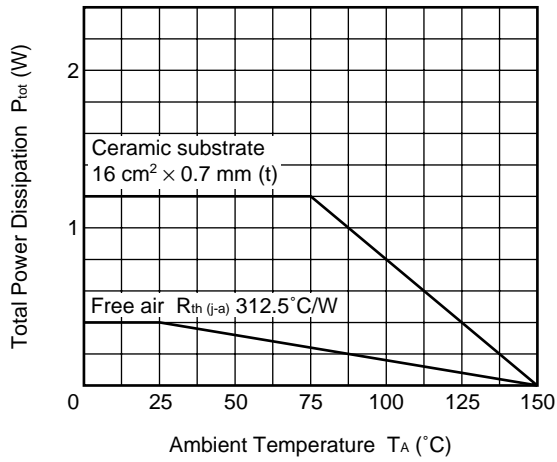
2. The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h_{FE} CLASSIFICATION

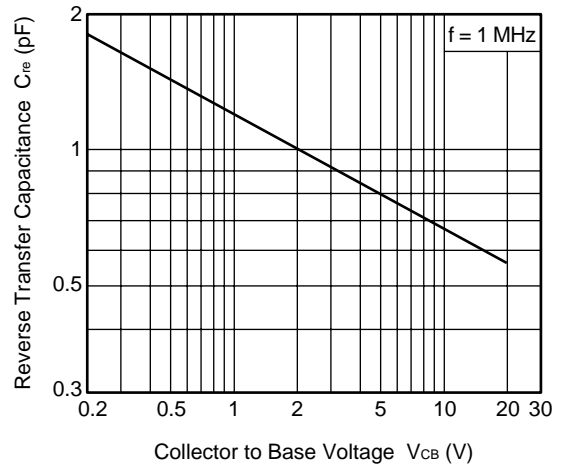
Rank	RH	RF	RE
Marking	RH	RF	RE
h_{FE} Value	50 to 100	80 to 160	125 to 250

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

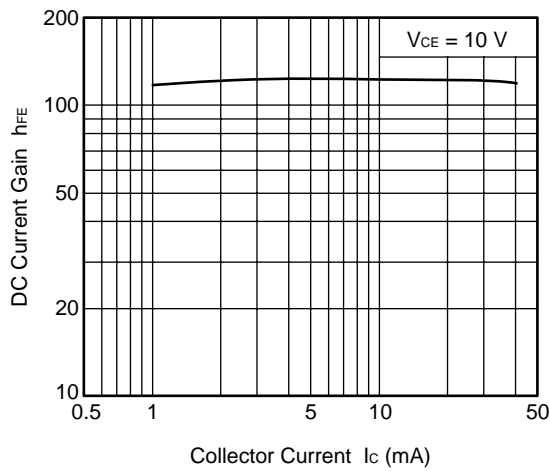
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



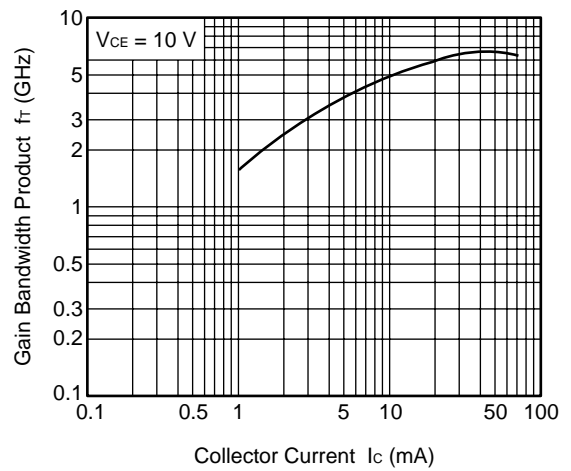
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



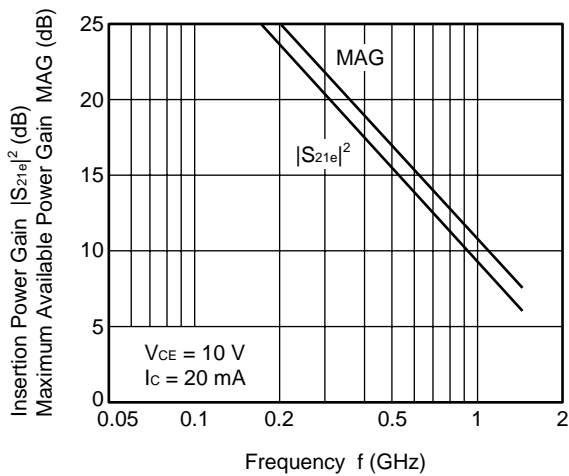
DC CURRENT GAIN vs. COLLECTOR CURRENT



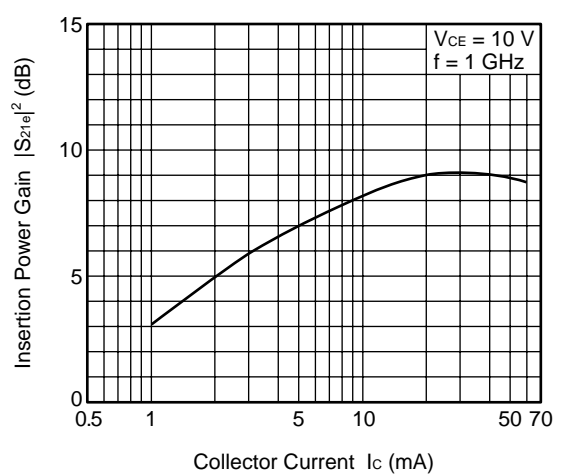
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



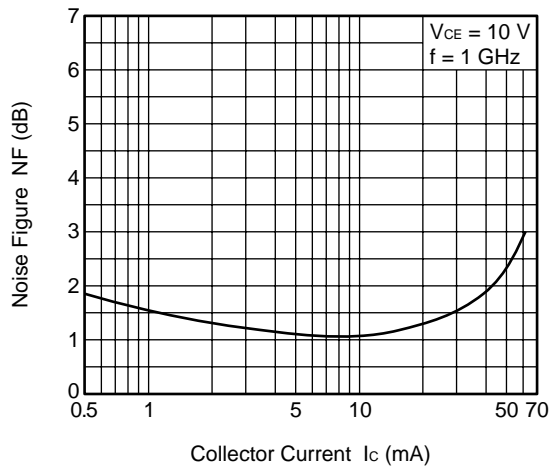
INSERTION POWER GAIN, MAG vs. FREQUENCY



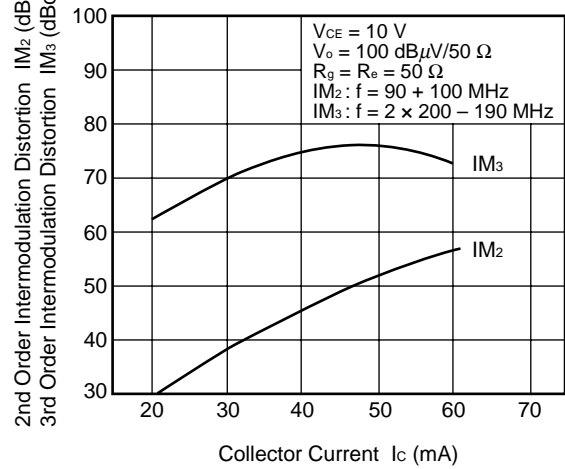
INSERTION POWER GAIN vs. COLLECTOR CURRENT



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.

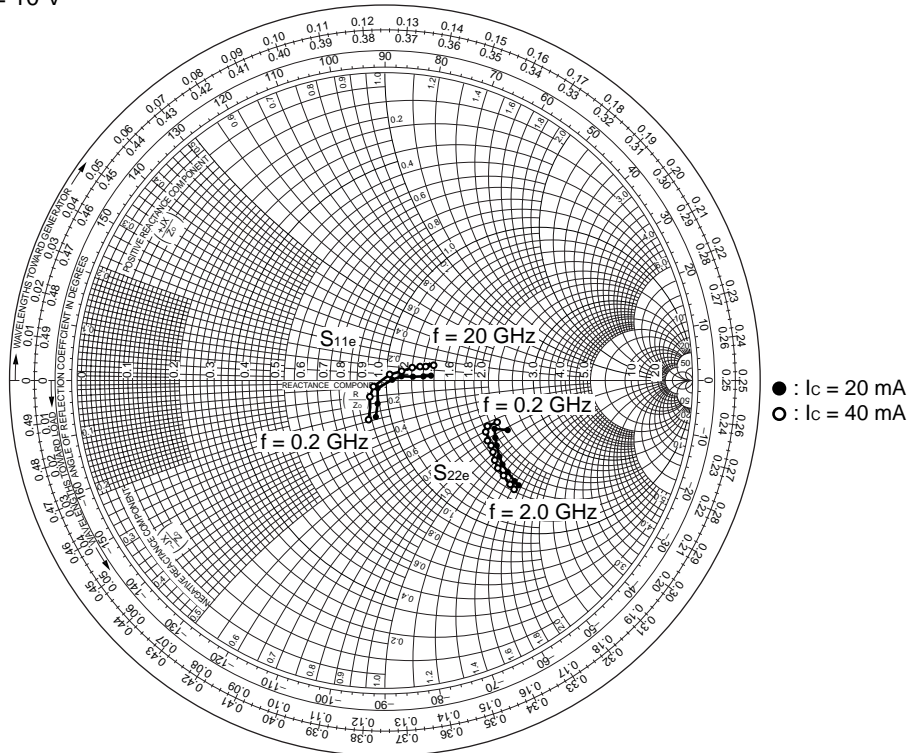
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

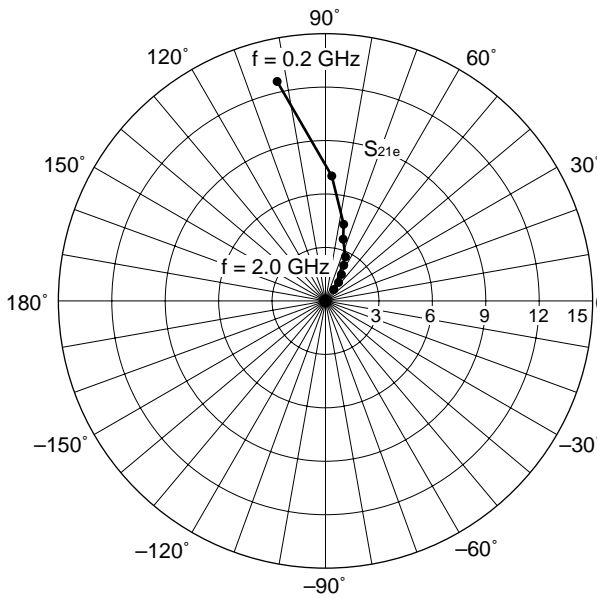
URL <http://www.csd-nec.com/>

★ SMITH CHART

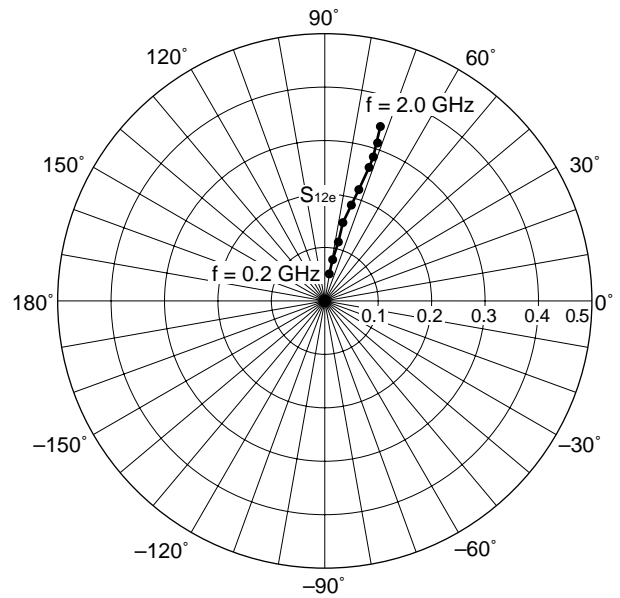
S_{11e}, S_{22e}-FREQUENCY
 CONDITION : V_{CE} = 10 V



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

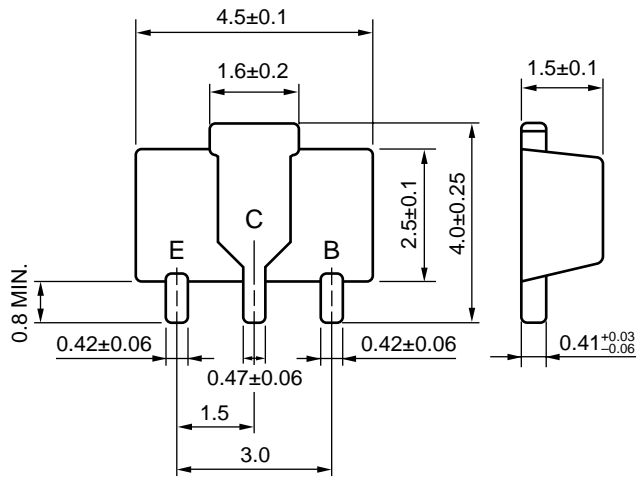


S_{12e}-FREQUENCY
 CONDITION : V_{CE} = 10 V, I_c = 20 mA



★ PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

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

(IEC : SOT-89)

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M8E 00.4-0110

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► **Technical issue**

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