

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 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 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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NPN SILICON RF TRANSISTOR  
**2SC5011**

NPN EPITAXIAL SILICON RF TRANSISTOR  
 FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION  
 4-PIN SUPER MINIMOLD

**FEATURES**

- High Gain Bandwidth Product (fr = 6.5 GHz TYP.)
- Low Noise, High Gain
- Low Voltage Operation
- 4-pin super minimold Package

★ **ORDERING INFORMATION**

Part Number	Quantity	Supplying Form
2SC5011	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape
2SC5011-T1	3 kpcs/reel	

**Remark** To order evaluation samples, contact your nearby sales office.  
 The unit sample quantity is 50 pcs.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25°C)**

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V <sub>CBO</sub>	20	V
Collector to Emitter Voltage	V <sub>CEO</sub>	12	V
Emitter to Base Voltage	V <sub>EBO</sub>	3	V
Collector Current	I <sub>C</sub>	100	mA
Total Power Dissipation	P <sub>tot</sub> <sup>Note</sup>	150	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

**Note** Free air

**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.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25°C)**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA	–	–	1.0	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0 mA	–	–	1.0	μA
DC Current Gain	h <sub>FE</sub> <sup>Note 1</sup>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	50	120	250	–
RF Characteristics						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	–	6.5	–	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA, f = 1.0 GHz	11	13	–	dB
Noise Figure	NF	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 7 mA, f = 1.0 GHz	–	1.1	2.0	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1.0 MHz	–	0.5	0.9	pF

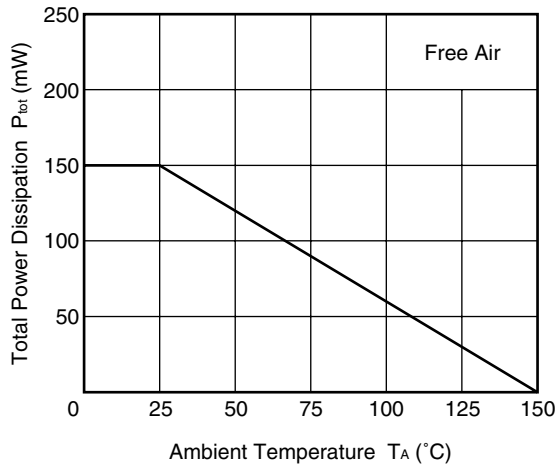
- Notes 1.** Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%  
**2.** Collector to base capacitance when the emitter grounded

**h<sub>FE</sub> CLASSIFICATION**

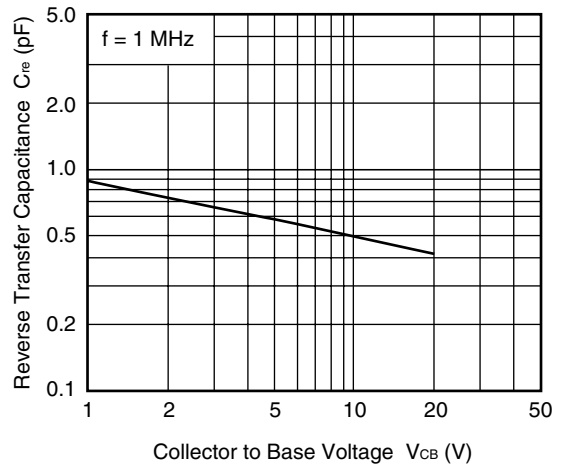
Rank	EB	FB	GB
Marking	R26	R27	R28
h <sub>FE</sub> Value	50 to 100	80 to 160	125 to 250

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

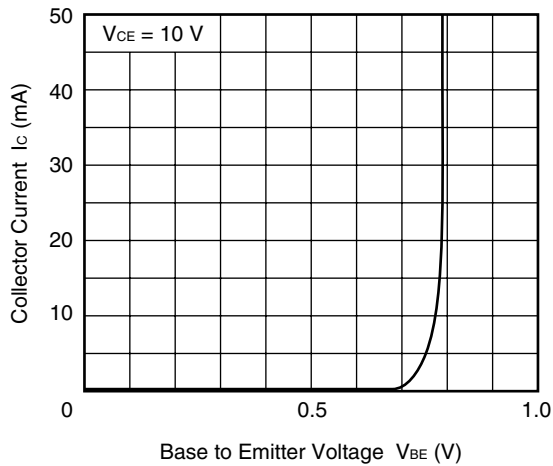
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



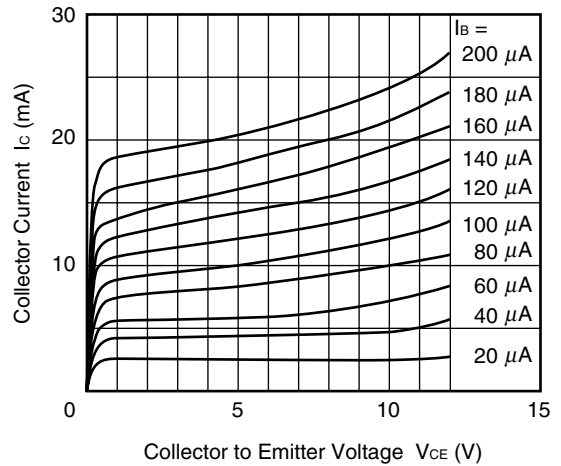
**REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE**



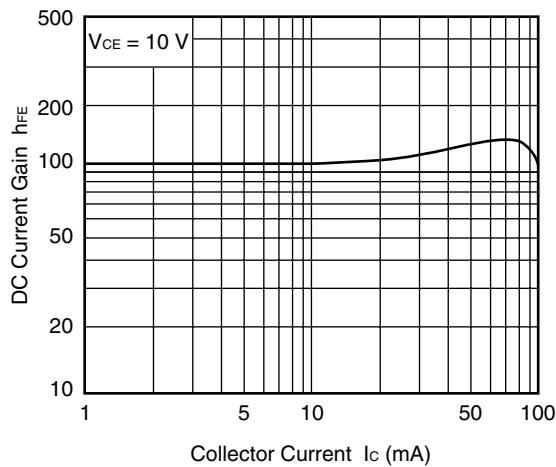
**COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE**



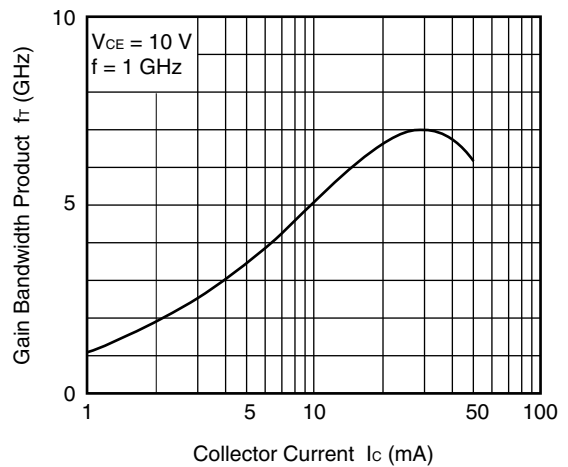
**COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE**



**DC CURRENT GAIN vs. COLLECTOR CURRENT**

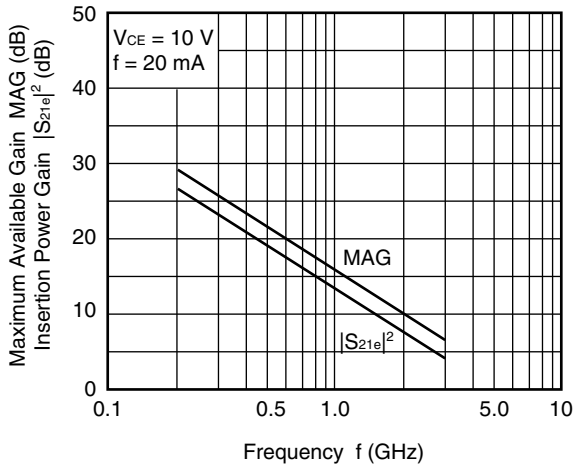


**GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT**

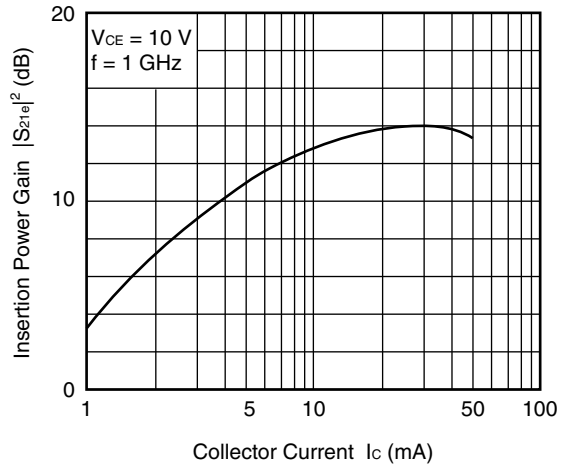


**Remark** The graphs indicate nominal characteristics.

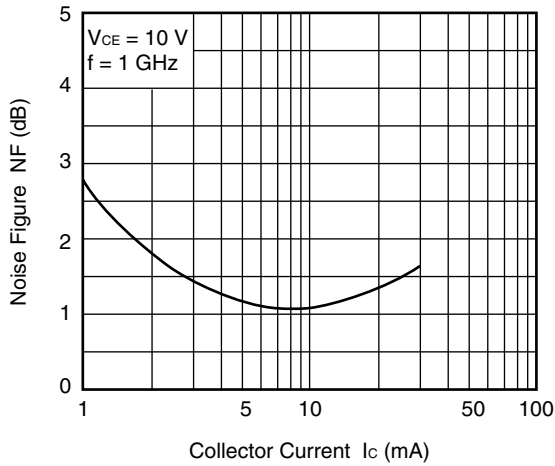
MAXIMUM AVAILABLE GAIN/INSERTION POWER GAIN vs. FREQUENCY



INSERTION POWER GAIN vs. COLLECTOR CURRENT



NOISE FIGURE 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.

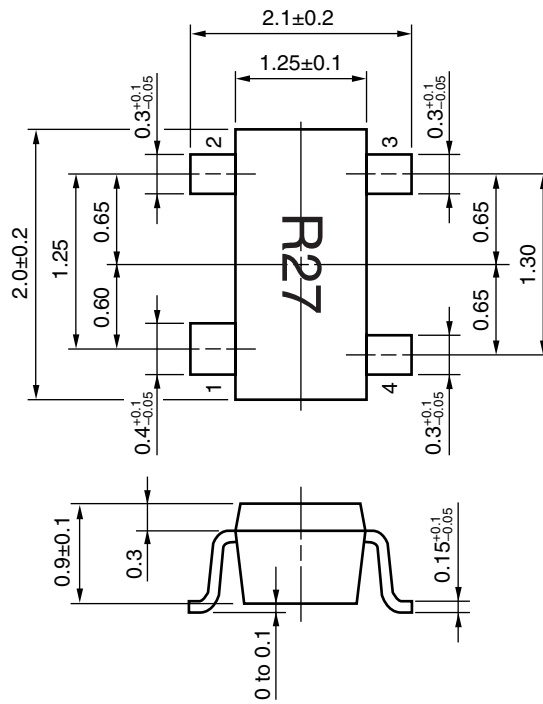
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.ncsd.necel.com/>

★ PACKAGE DIMENSIONS

4-PIN SUPER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

- 1. Collector
- 2. Emitter
- 3. Base
- 4. Emitter

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