

To our customers,

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## Old Company Name in Catalogs and Other Documents

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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  
**2SC5606**

NPN SILICON RF TRANSISTOR FOR  
 LOW NOISE · HIGH-GAIN AMPLIFICATION  
 3-PIN ULTRA SUPER MINIMOLD (19, 1608 PKG)

**FEATURES**

- Suitable for high-frequency oscillation
- $f_r = 25$  GHz technology adopted
- 3-pin ultra super minimold (19, 1608 PKG) package

<R> **ORDERING INFORMATION**

Part Number	Order Number	Package	Quantity	Supplying Form
2SC5606	2SC5606-A	3-pin ultra super minimold (19, 1608 PKG) (Pb-Free)	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (collector) face the perforation side of the tape
2SC5606-T1	2SC5606-T1-A		3 kpcs/reel	

**Remark** To order evaluation samples, please 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>	15	V
Collector to Emitter Voltage	V <sub>CEO</sub>	3.3	V
Emitter to Base Voltage	V <sub>EBO</sub>	1.5	V
Collector Current	I <sub>C</sub>	35	mA
Total Power Dissipation	P <sub>tot</sub> <sup>Note</sup>	115	mW
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

**Note** Mounted on 1.08 cm<sup>2</sup> × 1.0 mm (t) glass epoxy substrate

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

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**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> = 5 V, I <sub>E</sub> = 0 mA	–	–	200	nA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0 mA	–	–	200	nA
DC Current Gain	h <sub>FE</sub> <sup>Note 1</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 mA	60	80	100	–
RF Characteristics						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 20 mA, f = 2 GHz	–	21	–	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 20 mA, f = 2 GHz	10	12.5	–	dB
Noise Figure	NF	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 mA, f = 2 GHz, Z <sub>S</sub> = Z <sub>opt</sub>	–	1.2	1.5	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 2 V, I <sub>E</sub> = 0 mA, f = 1 MHz	–	0.21	0.3	pF
Maximum Available Power Gain	MAG <sup>Note 3</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 20 mA, f = 2 GHz	–	14	–	dB
Maximum Stable Power Gain	MSG <sup>Note 4</sup>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 20 mA, f = 2 GHz	–	15	–	dB

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

**3.**  $MAG = \left| \frac{S_{21}}{S_{12}} \right| (K - \sqrt{K^2 - 1})$

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

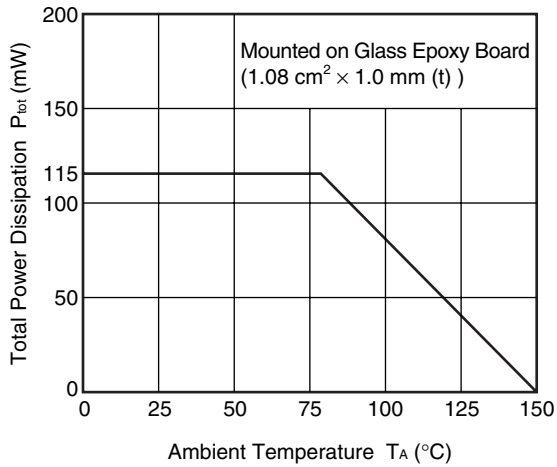
**h<sub>FE</sub> CLASSIFICATION**

<R>

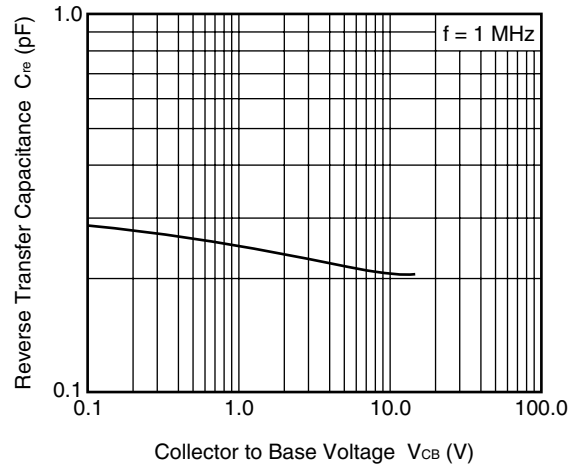
Rank	FB/YFB
Marking	UA
h <sub>FE</sub>	60 to 100

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

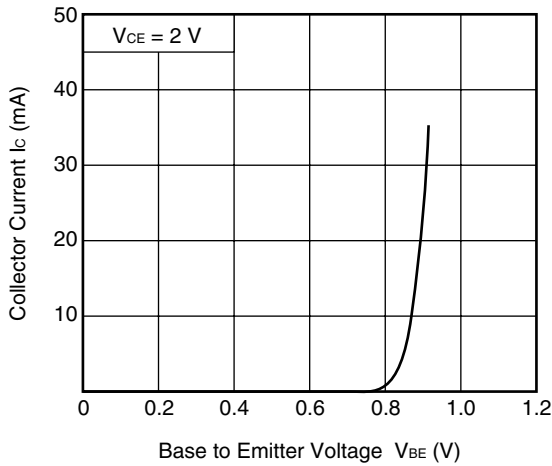
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



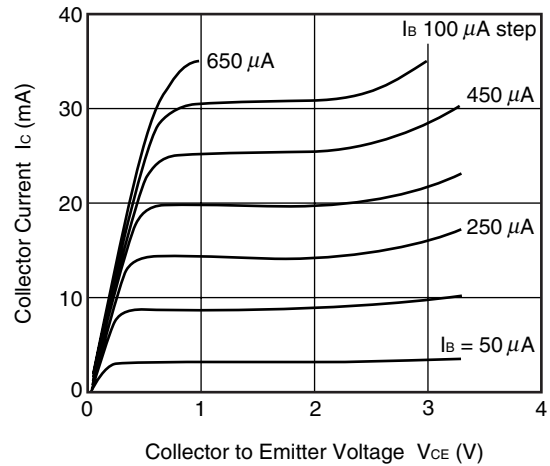
**REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE**



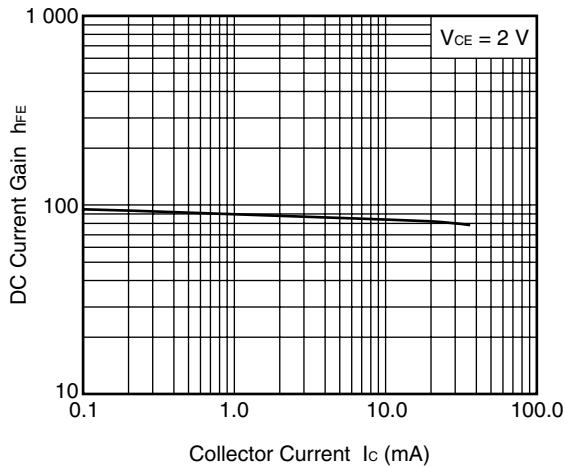
**COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE**



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

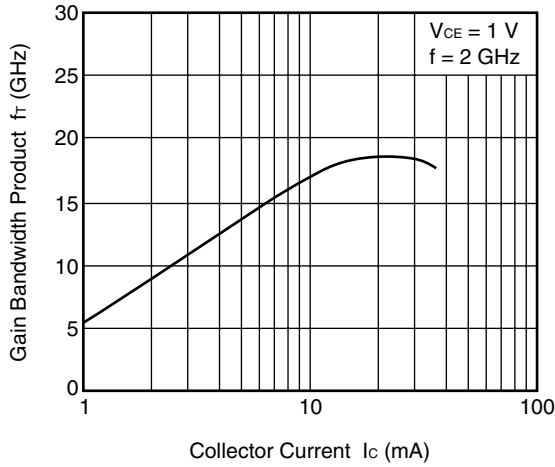


**DC CURRENT GAIN vs. COLLECTOR CURRENT**

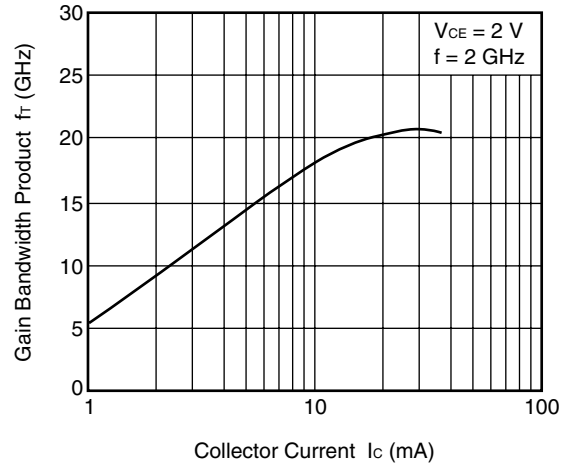


**Remark** The graphs indicate nominal characteristics.

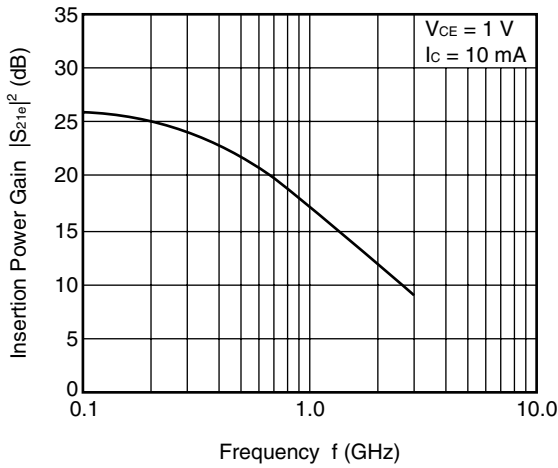
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



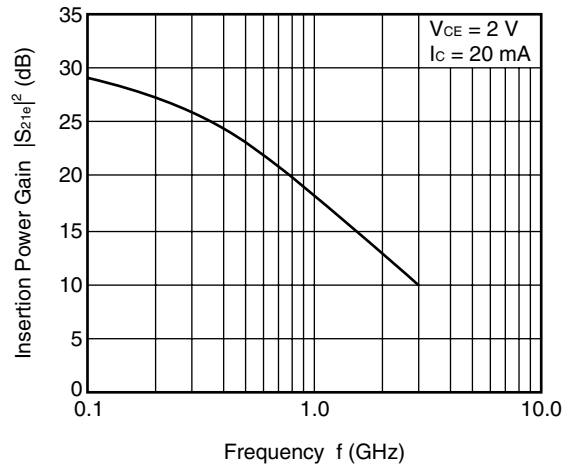
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



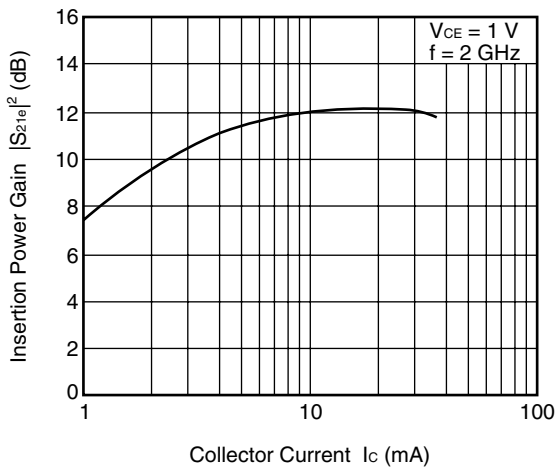
INSERTION POWER GAIN vs. FREQUENCY



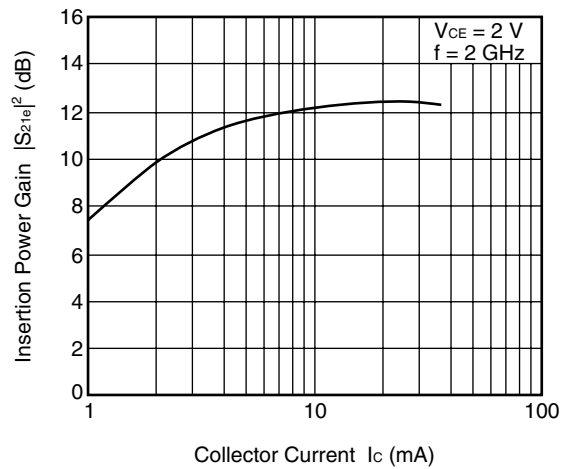
INSERTION POWER GAIN vs. FREQUENCY



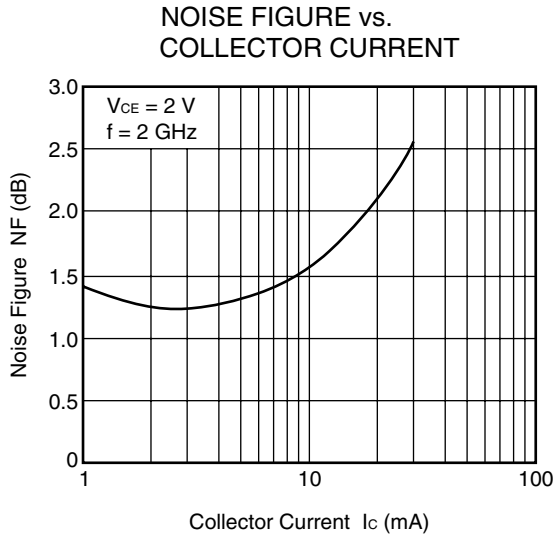
INSERTION POWER GAIN vs. COLLECTOR CURRENT



INSERTION POWER GAIN vs. COLLECTOR CURRENT



**Remark** The graphs indicate nominal characteristics.



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<R> **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.

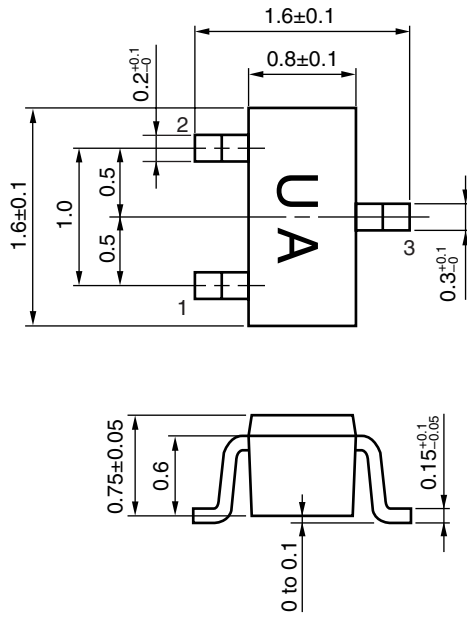
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.necel.com/microwave/en/>

PACKAGE DIMENSIONS

3-PIN ULTRA SUPER MINIMOLD (19, 1608 PKG) (UNIT: mm)



PIN CONNECTIONS

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



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