

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

2SC4227

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

DESCRIPTION

The 2SC4227 is a low supply voltage transistor designed for VHF, UHF low noise amplifier.

It is suitable for a high density surface mount assembly since the transistor has been applied 3-pin super minimold package.

FEATURES

- Low noise : $NF = 1.4 \text{ dB TYP. @ } V_{CE} = 3 \text{ V, } I_C = 7 \text{ mA, } f = 1 \text{ GHz}$
- High gain : $|S_{21e}|^2 = 12 \text{ dB TYP. @ } V_{CE} = 3 \text{ V, } I_C = 7 \text{ mA, } f = 1 \text{ GHz}$
- 3-pin super minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC4227	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (Collector) face the perforation side of the tape
2SC4227-T1	3 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.

The unit sample quantity is 50 pcs.

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	10	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	65	mA
Total Power Dissipation	P_{tot}^{Note}	150	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

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_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	–	–	0.8	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 mA	–	–	0.8	μA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 3 V, I _C = 7 mA	40	–	240	–
RF Characteristics						
Gain Bandwidth Product	f _T	V _{CE} = 3 V, I _C = 7 mA	4.5	7.0	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	10	12	–	dB
Noise Figure	NF	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	–	1.4	2.7	dB
★ Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 3 V, I _E = 0 mA, f = 1 MHz	–	0.45	0.9	pF

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

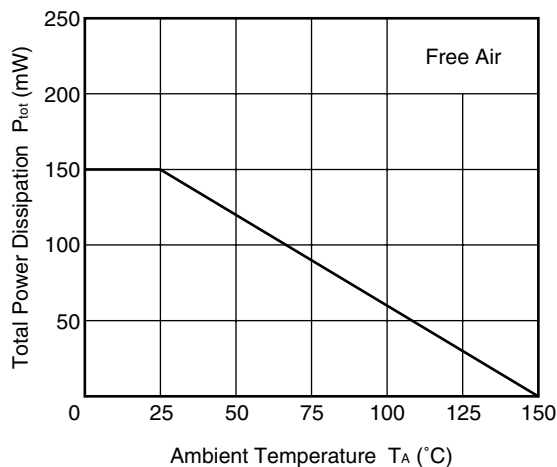
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

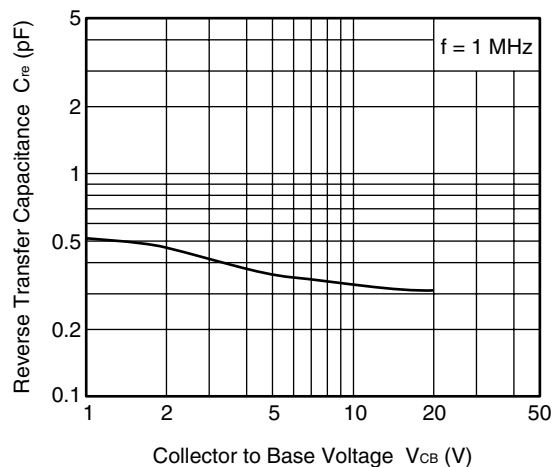
Rank	R33	R34	R35
Marking	R33	R34	R35
h _{FE} Value	40 to 90	70 to 150	110 to 240

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

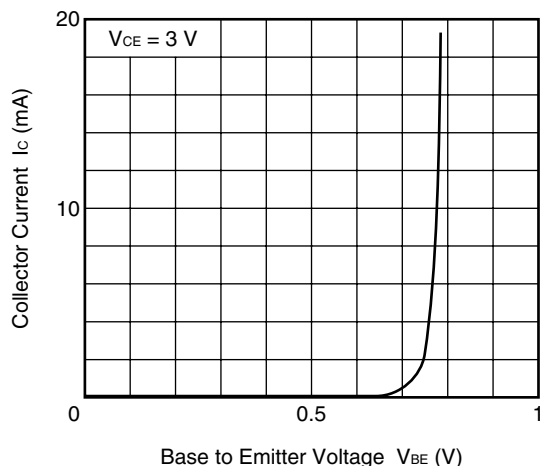
**TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE**



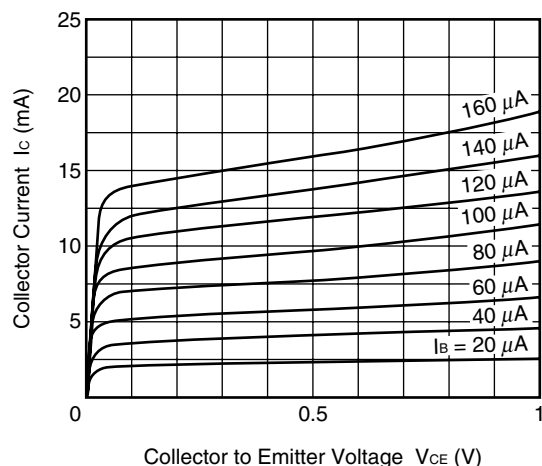
**REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE**



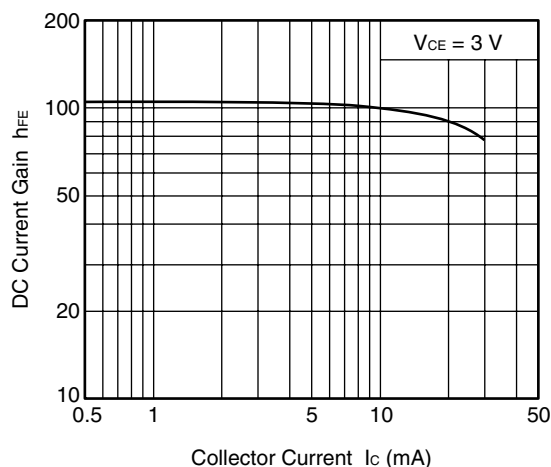
**COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE**



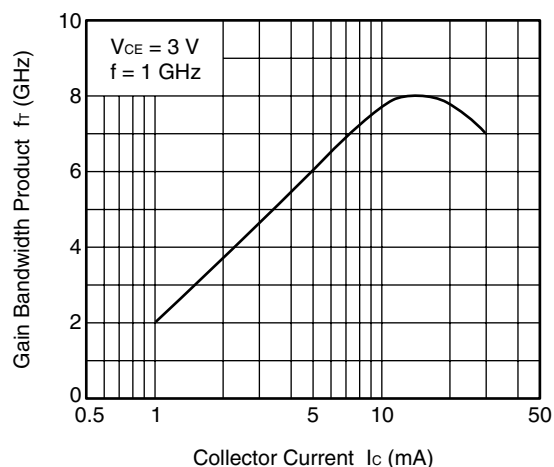
**COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE**



**DC CURRENT GAIN vs.
COLLECTOR CURRENT**

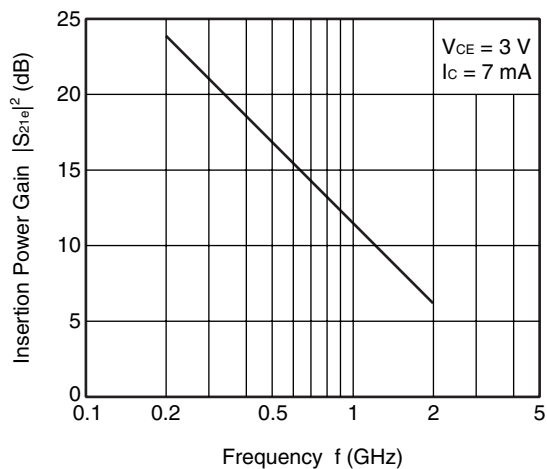


**GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT**

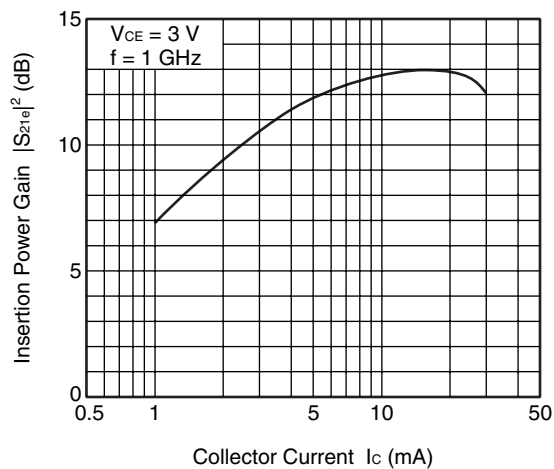


Remark The graphs indicate nominal characteristics.

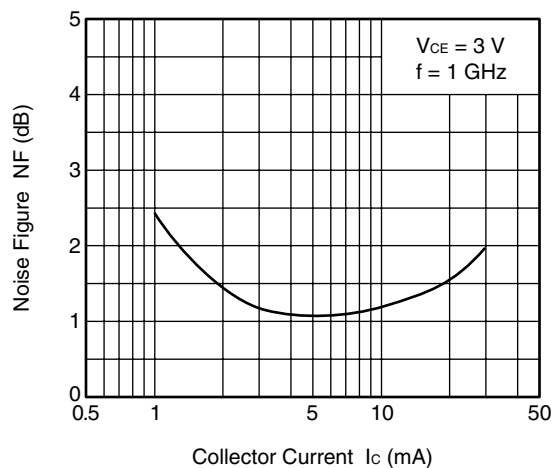
INSERTION POWER GAIN
vs. FREQUENCY



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.

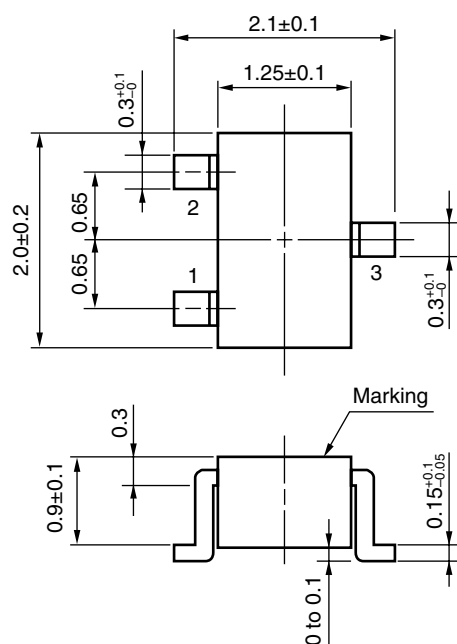
Click [here](#) to download S-parameters.

[RF and Microwave] → [Device Parameters]

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

PACKAGE DIMENSIONS

3-PIN SUPER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

- 1. Emitter
 - 2. Base
 - 3. Collector
- (EIAJ : SC-70)

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 "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
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