

DATA SHEET

NEC

NPN SILICON RF TRANSISTOR **2SC4228**

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

DESCRIPTION

The 2SC4228 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 = 1.9 dB TYP. @ $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$
- High gain : $|S_{21e}|^2 = 7.5\text{ dB TYP. @ } V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$, $f = 2\text{ GHz}$
- 3-pin super minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC4228	50 pcs (Non reel)	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 3 (Collector) face the perforation side of the tape
2SC4228-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	35	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)

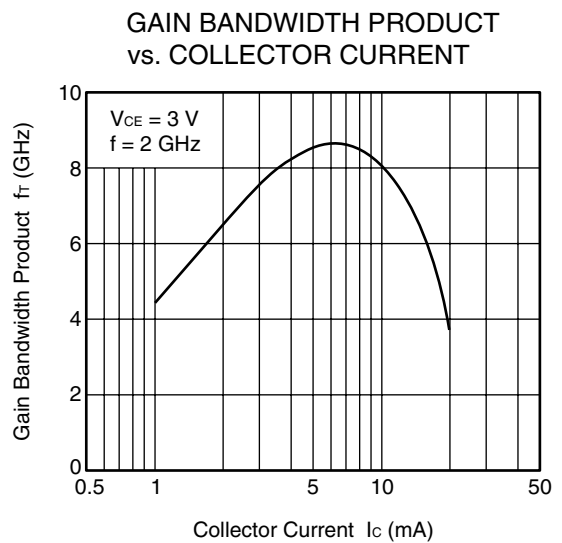
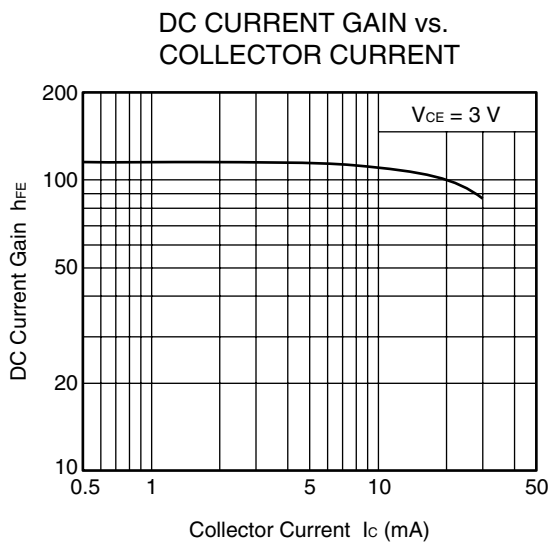
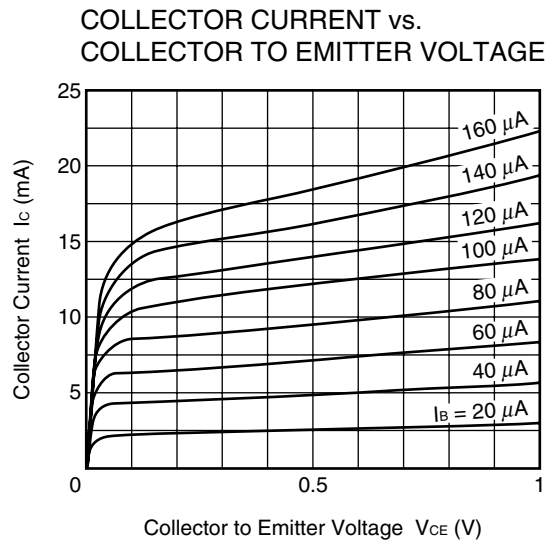
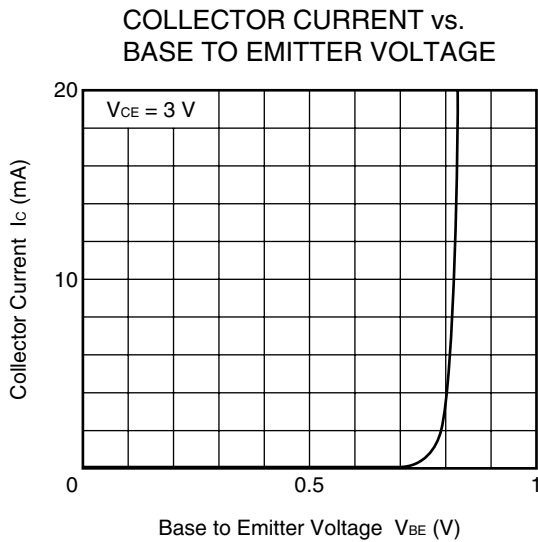
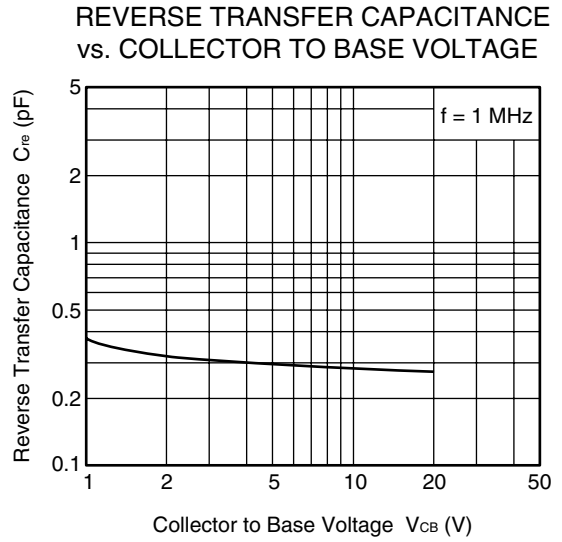
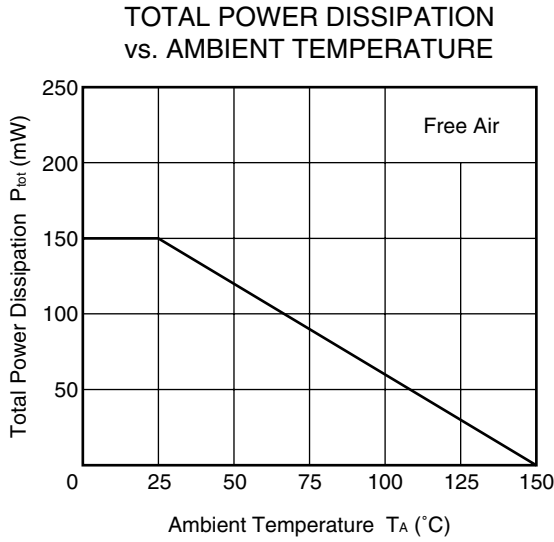
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I _{CBO}	V _{CB} = 10 V, I _E = 0 mA	–	–	1.0	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 1 V, I _C = 0 mA	–	–	1.0	μA
DC Current Gain	h _{FE} ^{Note 1}	V _{CE} = 3 V, I _C = 5 mA	50	100	250	–
RF Characteristics						
Gain Bandwidth Product	f _T	V _{CE} = 3 V, I _C = 5 mA, f = 2 GHz	5.5	8.0	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 3 V, I _C = 5 mA, f = 2 GHz	5.5	7.5	–	dB
Noise Figure	NF	V _{CE} = 3 V, I _C = 5 mA, f = 2 GHz	–	1.9	3.2	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 3 V, I _E = 0 mA, f = 1 MHz	–	0.3	0.7	pF

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

h_{FE} CLASSIFICATION

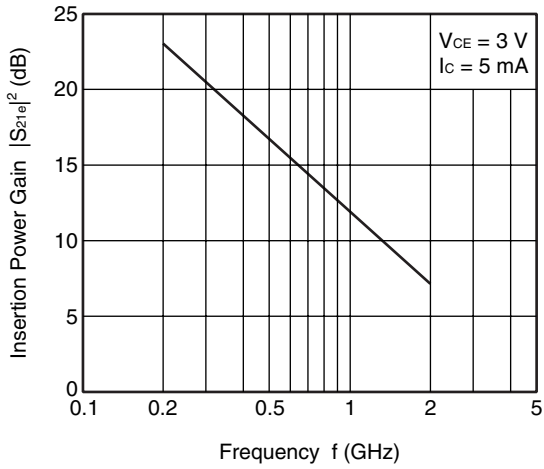
Rank	R43	R44	R45
Marking	R43	R44	R45
h _{FE} Value	50 to 100	80 to 160	125 to 250

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

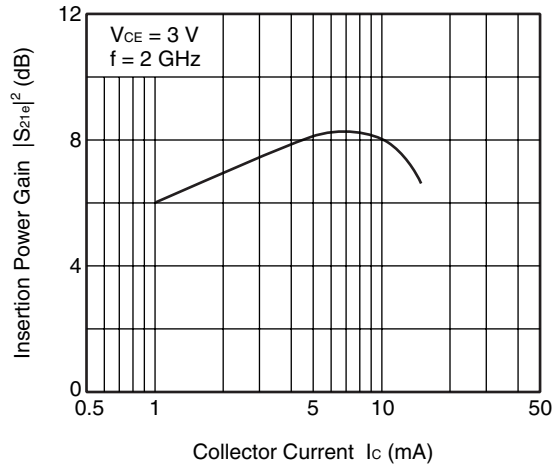


Remark The graphs indicate nominal characteristics.

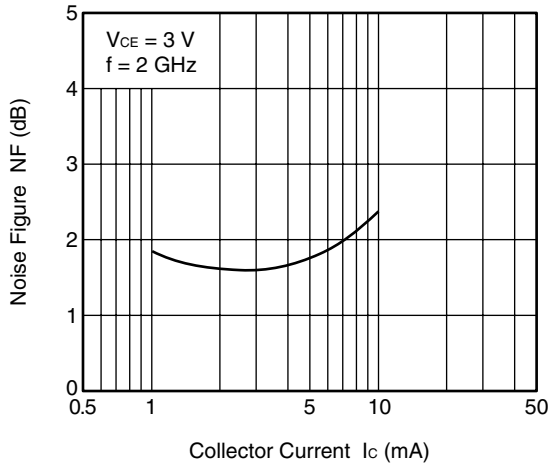
INSERTION POWER GAIN vs. FREQUENCY



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.

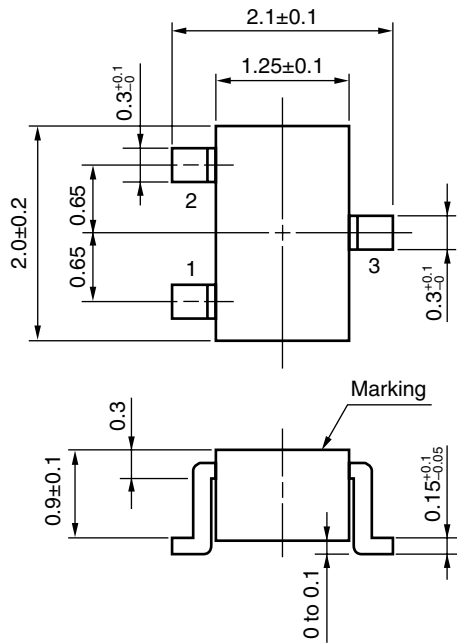
Click here to download S-parameters.

[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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