

# DATA SHEET

# NEC

## NPN SILICON RF TRANSISTOR **2SC2570A**

### NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION

#### DESCRIPTION

The 2SC2570A is designed for use in Low Noise Amplifier of VHF and UHF satges.

#### FEATURES

- Low noise and high gain : NF = 1.5 dB TYP.,  $G_a = 8$  dB TYP. @  $V_{CE} = 10$  V,  $I_c = 5$  mA,  $f = 1$  GHz
- Wide dynamic range : NF = 1.9 dB TYP.,  $G_a = 9$  dB TYP. @  $V_{CE} = 10$  V,  $I_c = 15$  mA,  $f = 1$  GHz

#### ★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC2570A	500 pcs (Non reel)	<ul style="list-style-type: none"> <li>• 18 mm wide radial taping</li> <li>• Supplying paper tape with in a box</li> </ul>
2SC2570A-T	2.5 kpcs/box (Box type)	

**Remark** To order evaluation samples, contact your nearby sales office.  
The unit sample quantity is 500 pcs.

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

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	$V_{CBO}$	25	V
Collector to Emitter Voltage	$V_{CEO}$	12	V
Emitter to Base Voltage	$V_{EBO}$	3.0	V
Collector Current	$I_c$	70	mA
Total Power Dissipation	$P_{tot}$ <small>Note</small>	600	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<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> = 1.0 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	40	–	200	–
RF Characteristics						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	–	5.0	–	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 GHz	8	10	–	dB
Noise Figure	NF	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA, f = 1 GHz	–	1.5	3.0	dB
Output Capacitance	C <sub>ob</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	–	0.7	0.9	pF
Maximum Available Power Gain	MAG	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA, f = 1 GHz	–	11.5	–	dB

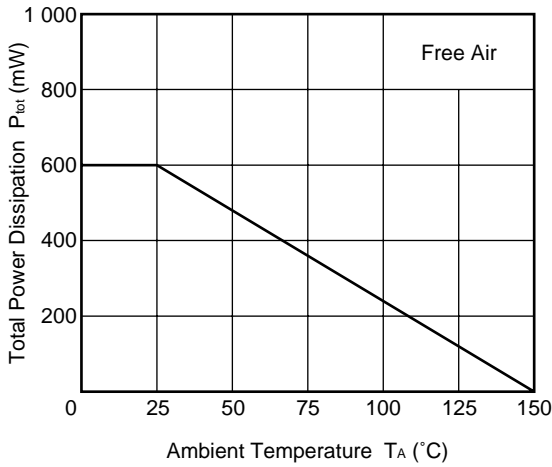
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%  
 2. Collector to base capacitance when the emitter grounded

★ **h<sub>FE</sub> CLASSIFICATION**

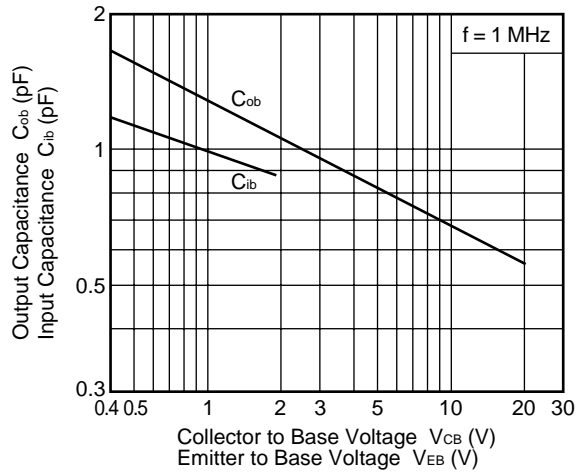
Rank	E
Marking	E
h <sub>FE</sub> Value	40 to 200

**TYPICAL CHARACTERISTICS (T<sub>A</sub> = +25°C, unless otherwise specified)**

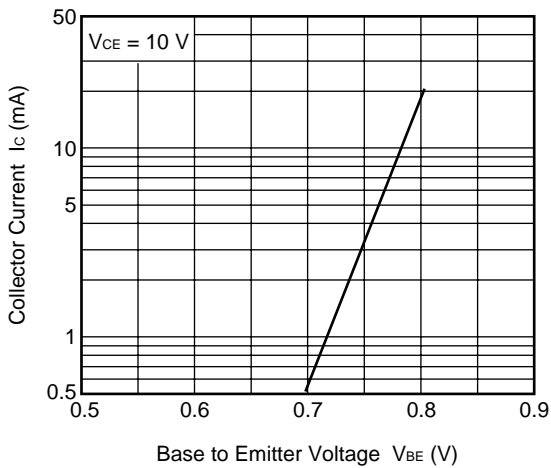
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



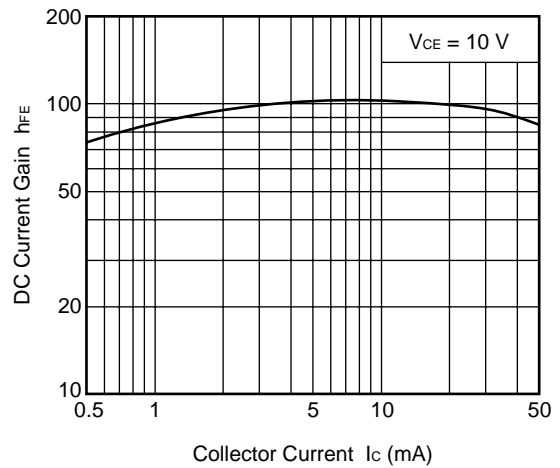
**OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE  
INPUT CAPACITANCE vs. EMITTER TO BASE VOLTAGE**



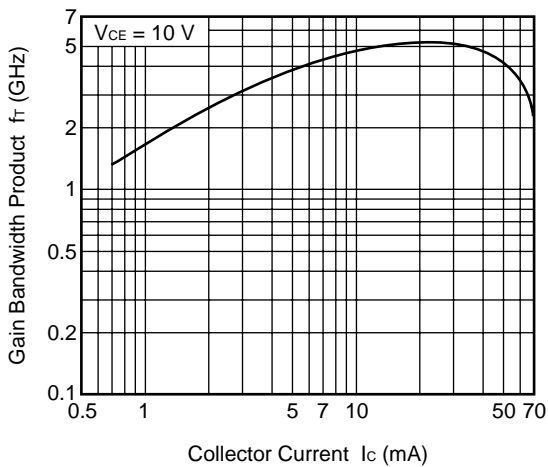
**COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE**



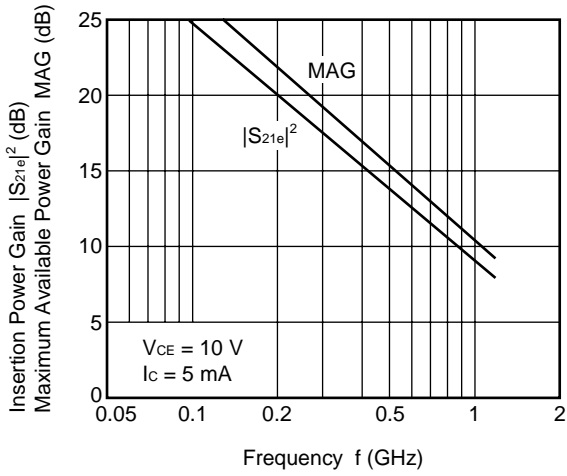
**DC CURRENT GAIN vs. COLLECTOR CURRENT**



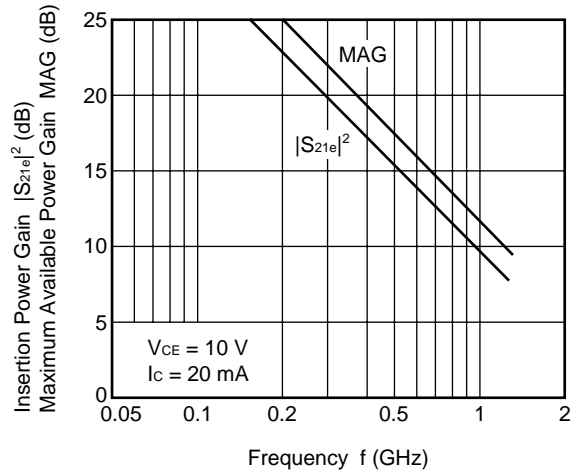
**GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT**



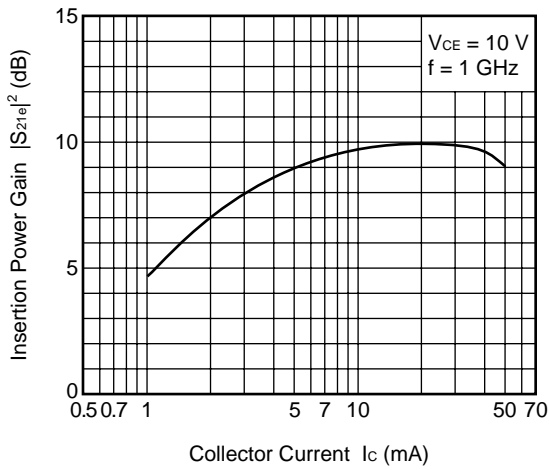
INSERTION POWER GAIN, MAG vs. FREQUENCY



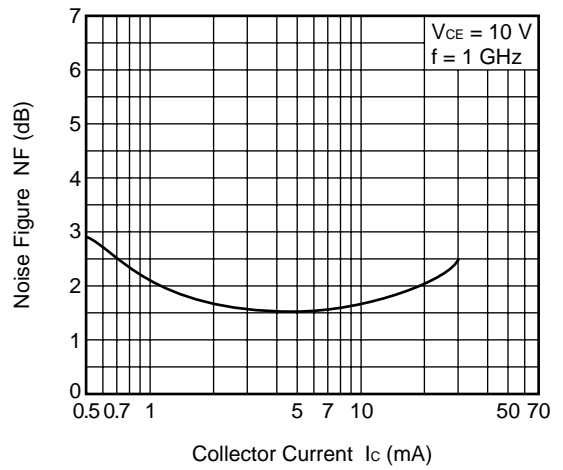
INSERTION POWER GAIN, MAG vs. FREQUENCY



INSERTION POWER GAIN vs. COLLECTOR CURRENT



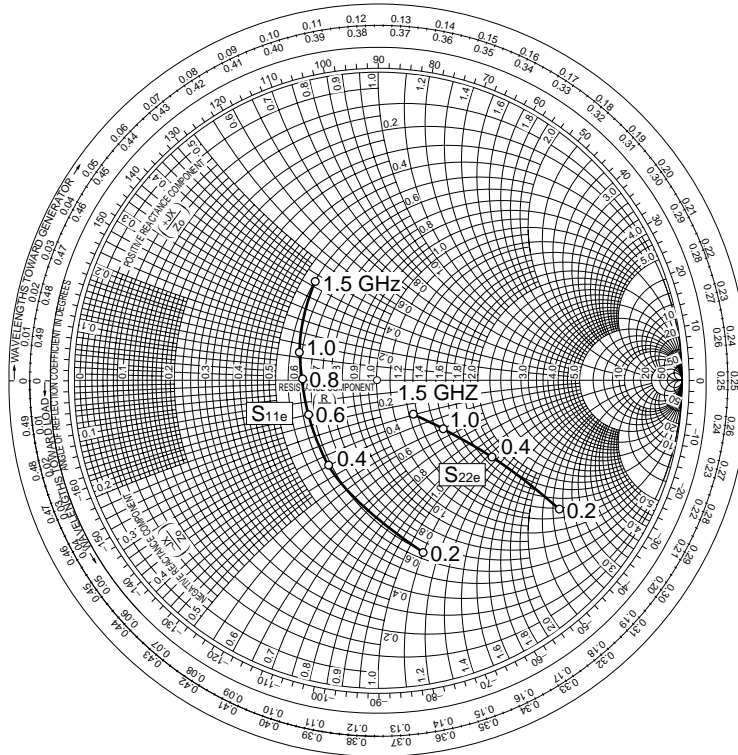
NOISE FIGURE vs. COLLECTOR CURRENT



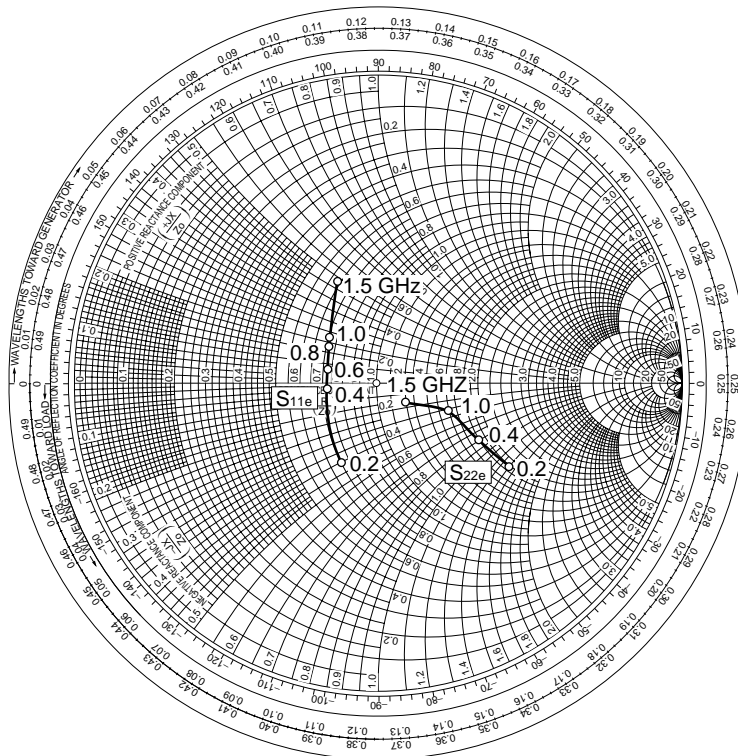
**Remark** The graphs indicate nominal characteristics.

SMITH CHART

$V_{CE} = 10\text{ V}$   
 $I_C = 5\text{ mA}$   
 $Z_0 = 50\ \Omega$

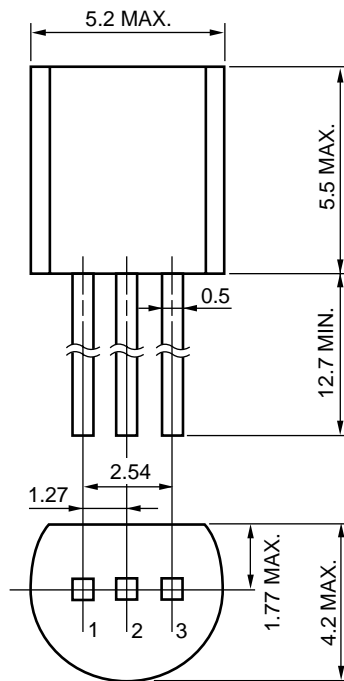


$V_{CE} = 10\text{ V}$   
 $I_C = 20\text{ mA}$   
 $Z_0 = 50\ \Omega$



★ PACKAGE DIMENSIONS

TO-92 (UNIT: mm)



**PIN CONNECTIONS**

- 1. Base      EIAJ : SC-43B
- 2. Emitter   JEDEC: TO-92
- 3. Collector   IEC : PA33

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