

# DATA SHEET



## NPN SILICON RF TRANSISTOR **NE68539 / 2SC4957**

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

#### FEATURES

- Low Noise, High Gain
- Low Voltage Operation
- Low Reverse Transfer Capacitance  
 $C_{re} = 0.3 \text{ pF TYP.}$
- 4-pin minimold Package

#### ★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC4957	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape
2SC4957-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	$V_{CBO}$	9	V
Collector to Emitter Voltage	$V_{CEO}$	6	V
Emitter to Base Voltage	$V_{EBO}$	2	V
Collector Current	$I_C$	30	mA
Total Power Dissipation	$P_{tot}^{\text{Note}}$	180	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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.  
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
<b>DC Characteristics</b>						
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0 mA	–	–	100	nA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0 mA	–	–	100	nA
DC Current Gain	h <sub>FE</sub> <sup>Note 1</sup>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA	75	–	150	–
<b>RF Characteristics</b>						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA	–	12	–	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2.0 GHz	9	11	–	dB
Noise Figure	NF	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 3 mA, f = 2.0 GHz	–	1.5	2.5	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 3 V, I <sub>E</sub> = 0 mA, f = 1.0 MHz	–	0.3	0.5	pF

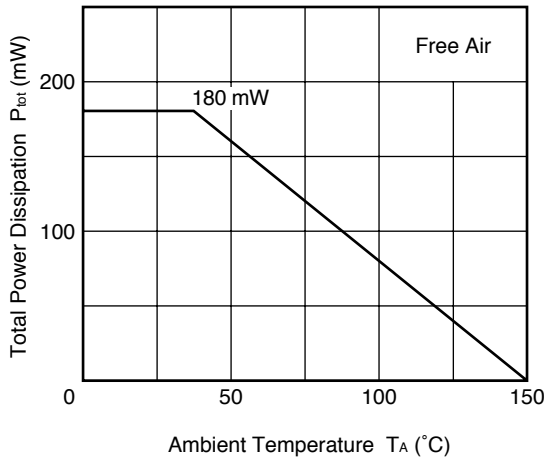
- Notes 1.** Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%  
**2.** Collector to base capacitance when the emitter grounded

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

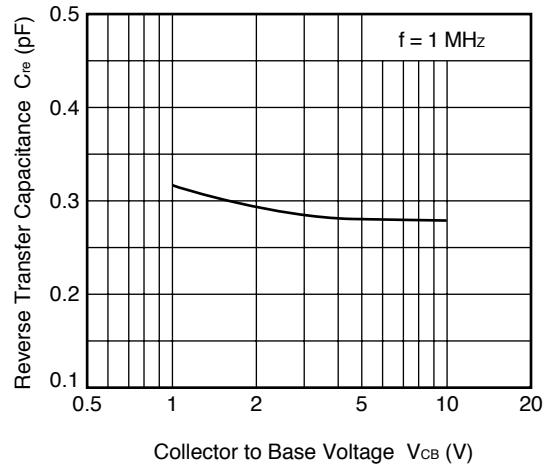
Rank	T83
Marking	T83
h <sub>FE</sub> Value	75 to 150

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

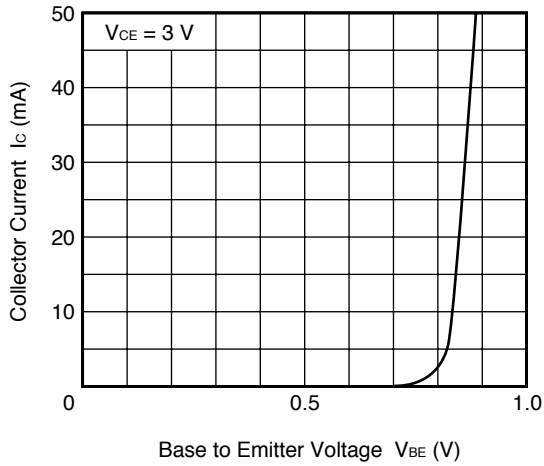
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



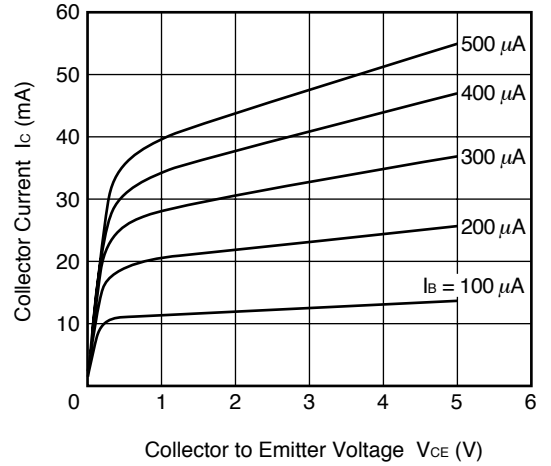
**REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE**



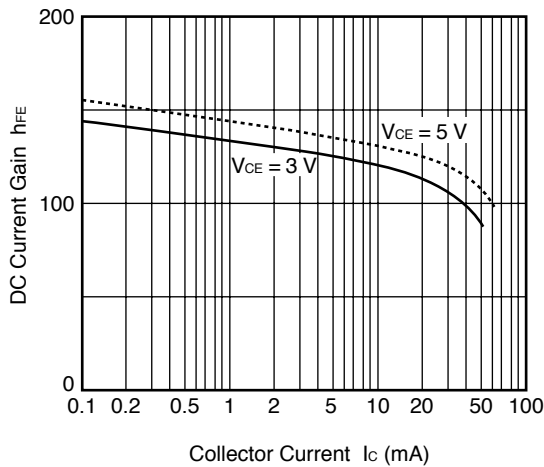
**COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE**



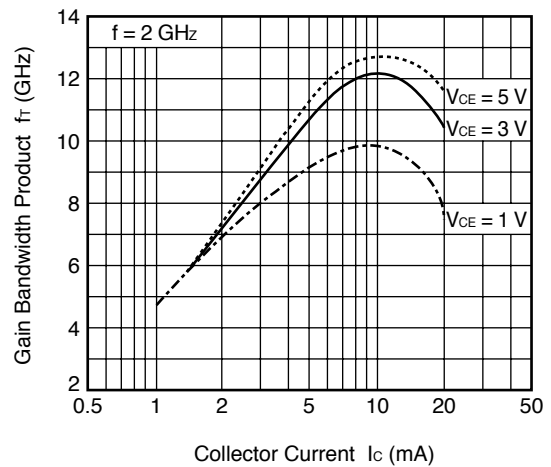
**COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE**



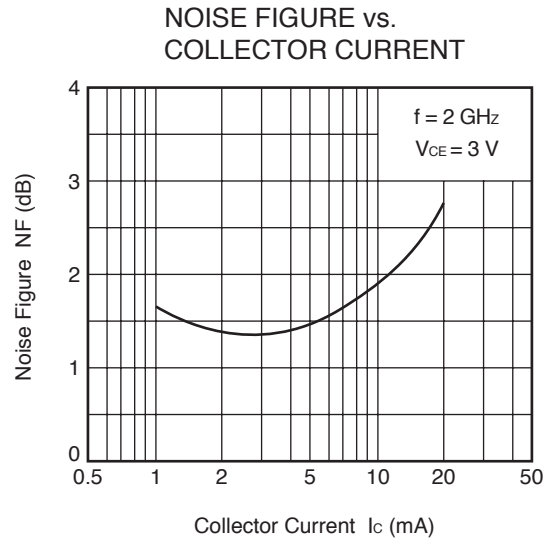
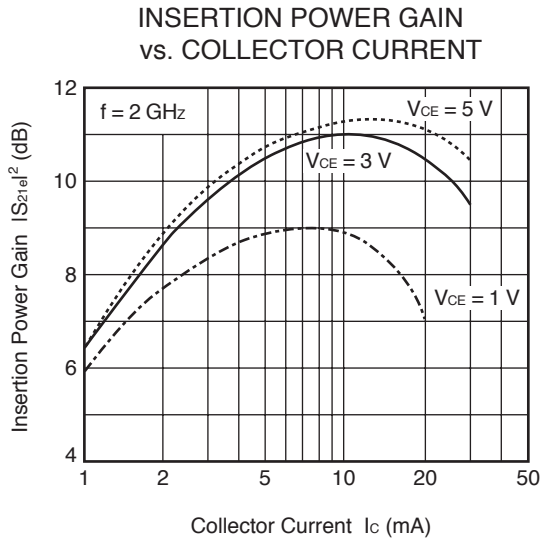
**DC CURRENT GAIN vs. COLLECTOR CURRENT**



**GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT**



**Remark** The graphs indicate nominal characteristics.



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★ **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.

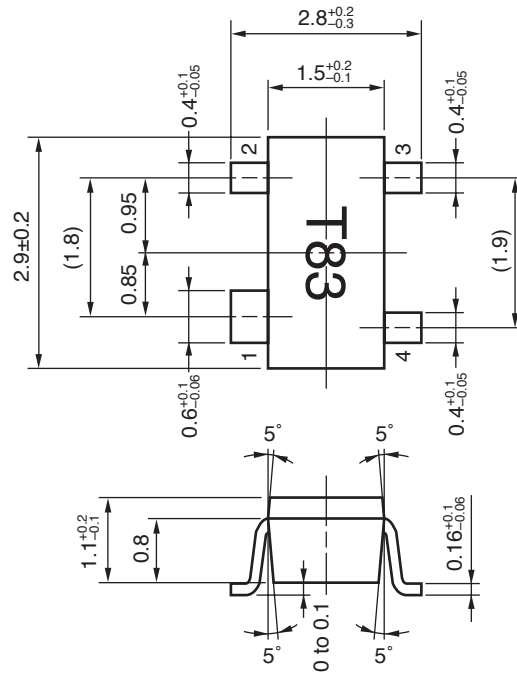
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

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

★ **PACKAGE DIMENSIONS**

**4-PIN MINIMOLD PACKAGE (UNIT: mm)**



**PIN CONNECTIONS**

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