



# NPN SILICON RF TRANSISTOR

## NE85618 / 2SC5011 JEITA Part No.

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

#### FEATURES

- High Gain Bandwidth Product ( $f_T = 6.5$  GHz TYP.)
- Low Noise, High Gain
- Low Voltage Operation
- 4-pin super mini mold Package

#### ★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE85618-A 2SC5011-A	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape
NE85618-T1-A 2SC5011-T1-A	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	$V_{CEO}$	12	V
Emitter to Base Voltage	$V_{EBO}$	3	V
Collector Current	$I_C$	100	mA
Total Power Dissipation	$P_{tot}$ <sup>Note</sup>	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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**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 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	50	120	250	–
RF Characteristics						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	–	6.5	–	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA, f = 1.0 GHz	11	13	–	dB
Noise Figure	NF	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 7 mA, f = 1.0 GHz	–	1.1	2.0	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1.0 MHz	–	0.5	0.9	pF

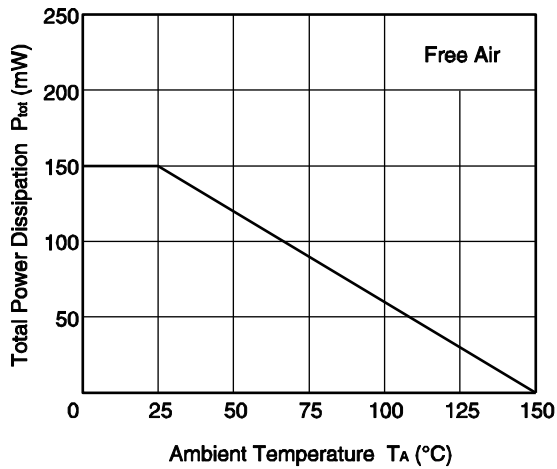
- Notes 1.** Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%  
**2.** Collector to base capacitance when the emitter grounded

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

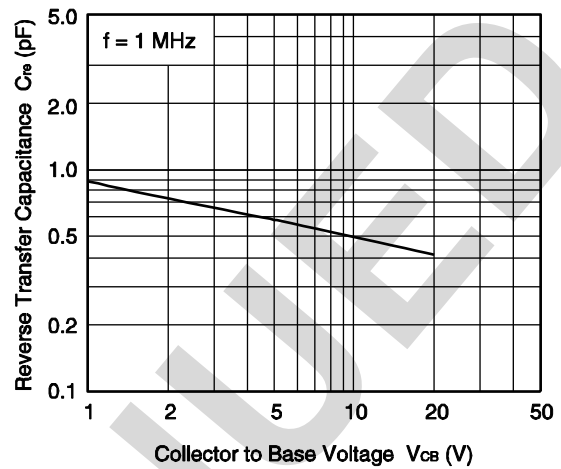
Rank	EB	FB	GB
Marking	R26	R27	R28
h <sub>FE</sub> Value	50 to 100	80 to 160	125 to 250

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

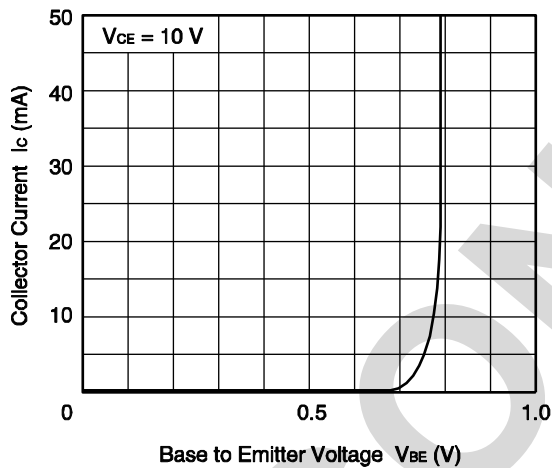
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



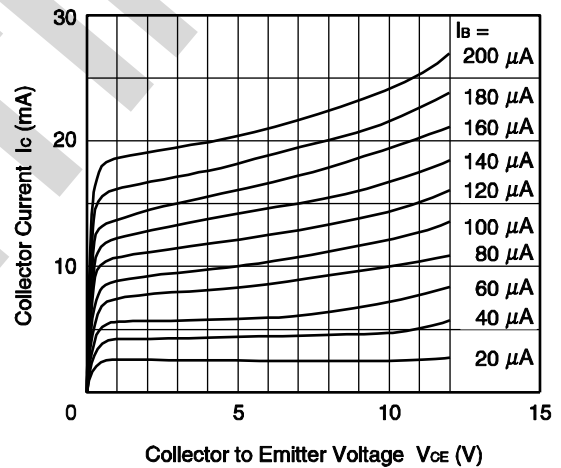
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



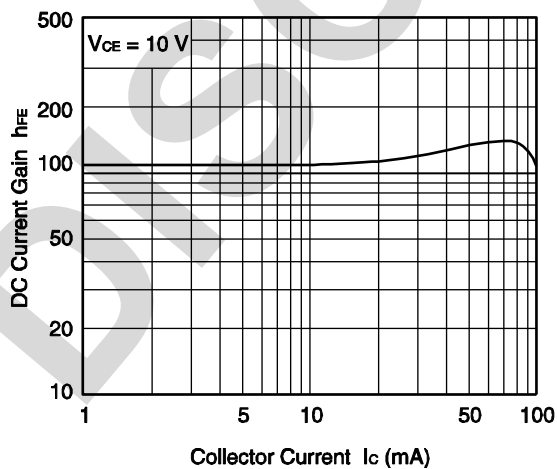
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



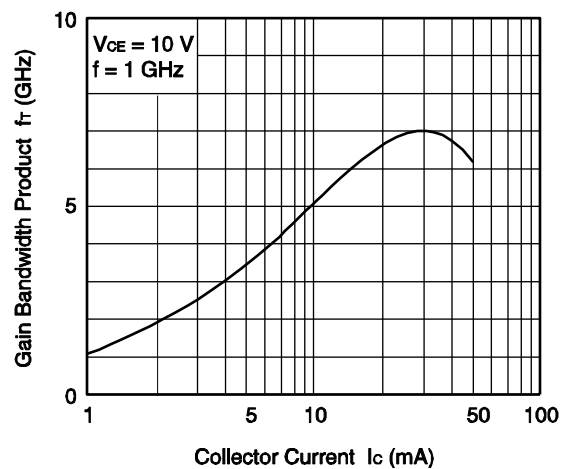
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT

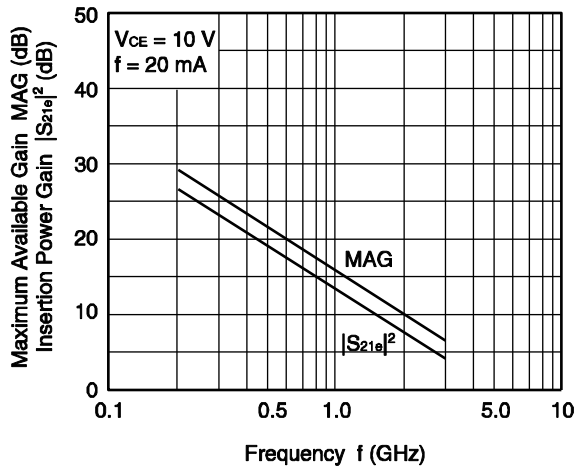


GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

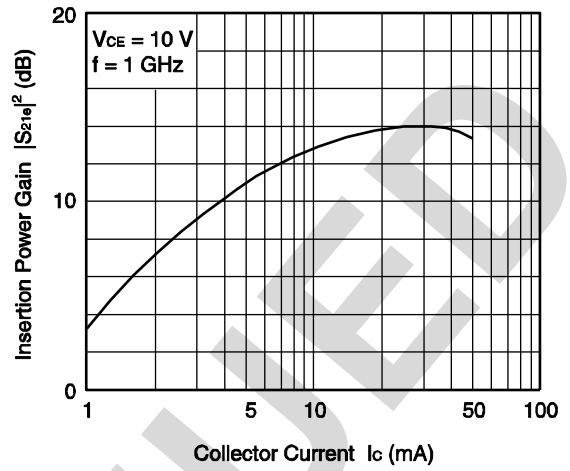


Remark The graphs indicate nominal characteristics.

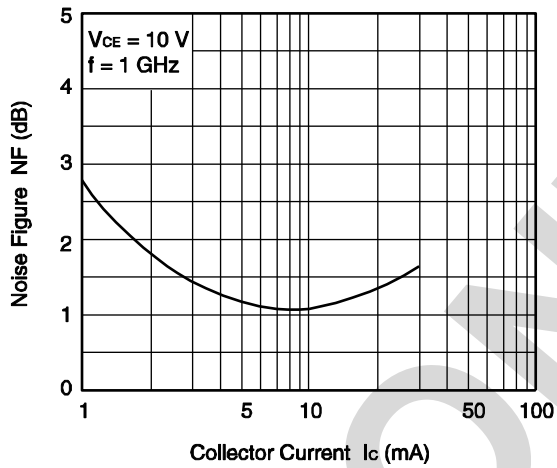
**MAXIMUM AVAILABLE GAIN/INSERTION POWER GAIN vs. FREQUENCY**



**INSERTION POWER GAIN vs. COLLECTOR CURRENT**



**NOISE FIGURE vs. COLLECTOR CURRENT**



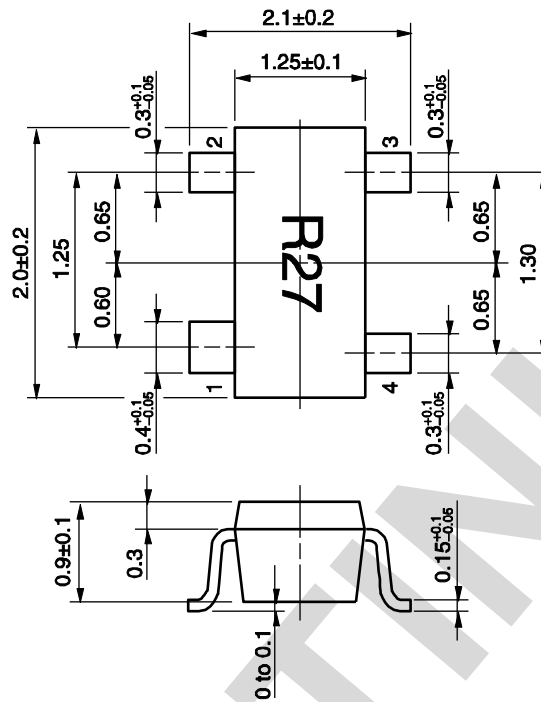
**Remark** The graphs indicate nominal characteristics.

★ **S-PARAMETERS**

- S-parameters 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

4-PIN SUPER MINIMOLD (UNIT: mm)



**PIN CONNECTIONS**

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

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