DATA SHEET

NEC

NPN SILICON RF TRANSISTOR
2SC4703

NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW DISTORTION AMPLIFIER 3-PIN POWER MINIMOLD

DESCRIPTION

The 2SC4703 is designed for low distortion, low noise RF amplifier operating with low supply voltage (V_{CE} = 5 V). This low distortion characteristic makes it suitable for CATV, tele-communication and other use. It employs surface mount type plastic package, power minimold (SOT-89).

FEATURES

- Low distortion, low voltage: IM_2 = 55 dBc TYP., IM_3 = 76 dBc TYP. @ V_{CE} = 5 V, I_C = 50 mA, V_O = 105 dBμV/75Ω
- Large P_{tot} : P_{tot} = 1.8 W (Mounted on double-sided copper-clad 16 $cm^2 \times 0.7$ mm (t) ceramic substrate)
- Small package : 3-pin power minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC4703	25 pcs (Non reel)	• 12 mm wide embossed taping
2SC4703-T1	1 kpcs/reel	• Collector face the perforation side of the tape

Remark To order evaluation samples, contact your nearby sales office.
The unit sample quantity is 25 pcs.

ABSOLUTE MAXIMUM RATINGS (T_A = +25°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}	2.5	V
Collector Current	I_C	150	mA
Total Power Dissipation	P_{tot} Note	1.8	W
Junction Temperature	T_j	150	°C
★ Storage Temperature	T_{stg}	–65 to +150	°C

Note Mounted on double-sided copper-clad 16 $cm^2 \times 0.7$ mm (t) ceramic substrate

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

	Parameter	Symbol	Test Conditions		MIN.	TYP.	MAX.	Unit
	DC Characteristics							
	Collector Cut-off Current	I_{CBO}	V_{CB} = 20 V, I_E = 0 mA		–	–	1.5	μA
	Emitter Cut-off Current	I_{EBO}	V_{EB} = 2 V, I_C = 0 mA		–	–	1.5	μA
★	DC Current Gain	h_{FE} Note 1	V_{CE} = 5 V, I_C = 50 mA		50	–	250	–
	RF Characteristics							
★	Gain Bandwidth Product	f_T	V_{CE} = 5 V, I_C = 50 mA		–	6.0	–	GHz
	Insertion Power Gain (1)	$\|S_{21e}\|^2$	V_{CE} = 5 V, I_C = 50 mA, f = 1 GHz		6.5	8.3	–	dB
	Insertion Power Gain (2)	$\|S_{21e}\|^2$	V_{CE} = 10 V, I_C = 20 mA, f = 1 GHz		–	8.5	–	dB
	Noise Figure	NF	V_{CE} = 5 V, I_C = 50 mA, f = 1 GHz		–	2.3	3.5	dB
	Collector Capacitance	C_{ob} Note 2	V_{CB} = 5 V, I_E = 0 mA, f = 1 MHz		–	1.5	2.5	pF
★	2nd Order Intermoduration Distortion	IM_2	I_C = 50 mA, V_O = 105 dBμV/75 Ω, f = 190 – 90 MHz	V_{CE} = 5 V	–	55	–	dBc
				V_{CE} = 10 V		63	–	
★	3rd Order Intermoduration Distortion	IM_3	I_C = 50 mA, V_O = 105 dBμV/75 Ω, f = 2 × 190 – 200 MHz	V_{CE} = 5 V	–	76	–	dBc
				V_{CE} = 10 V	–	81	–	

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

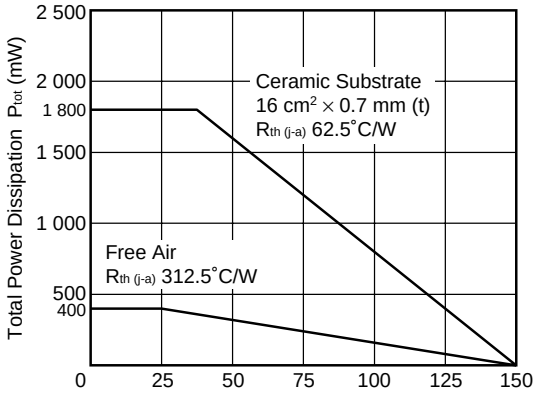
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

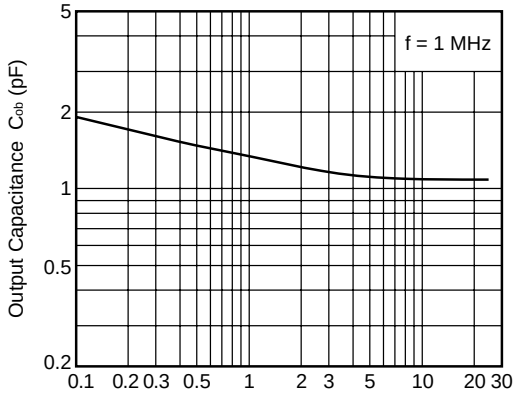
Rank	SH	SF	SE
Marking	SH	SF	SE
h_{FE} Value	50 to 100	80 to 160	125 to 250

★ TYPICAL CHARACTERISTICS (T_A = +25°C)

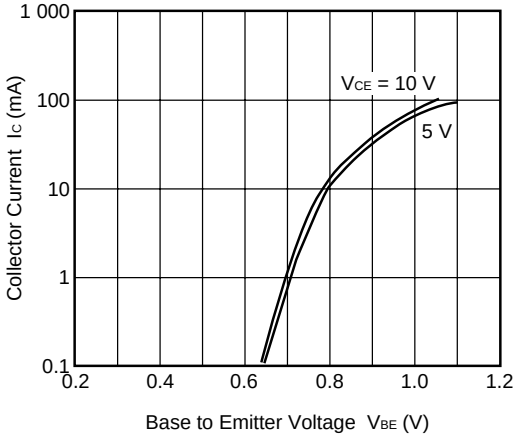
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



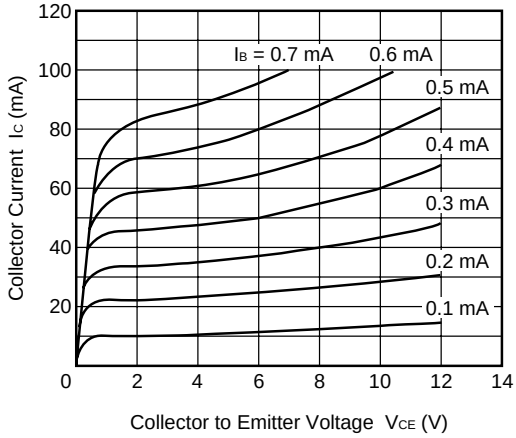
OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



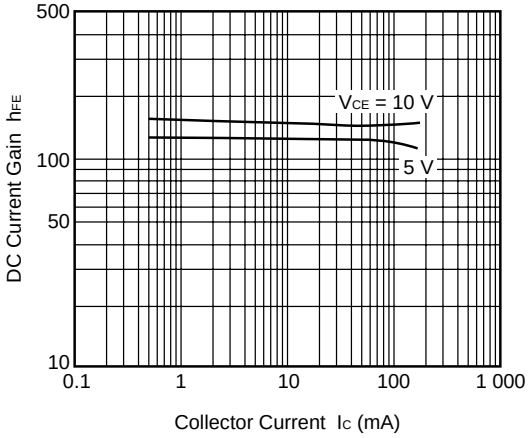
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



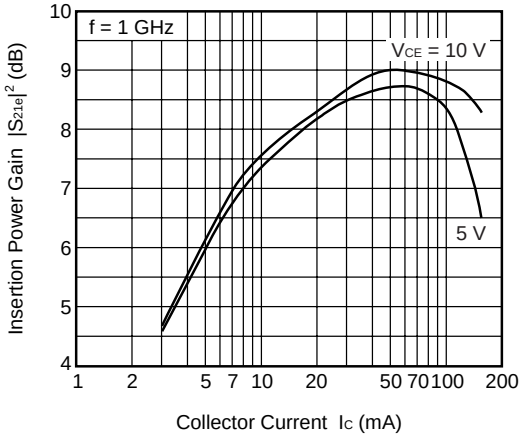
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



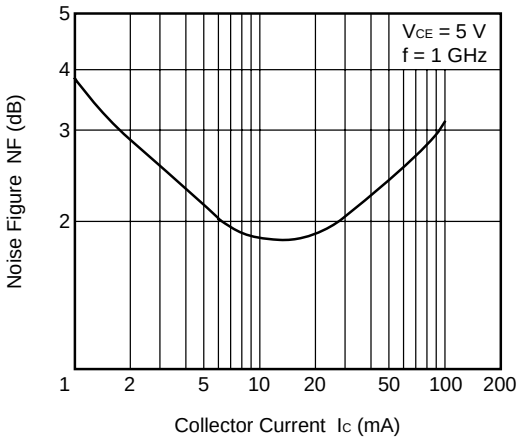
DC CURRENT GAIN vs. COLLECTOR CURRENT



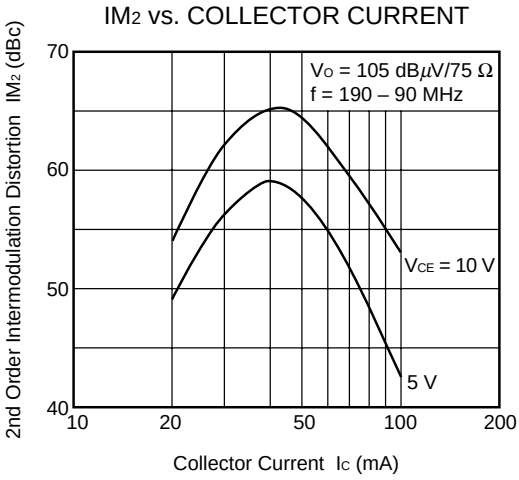
INSERTION POWER GAIN vs. COLLECTOR CURRENT



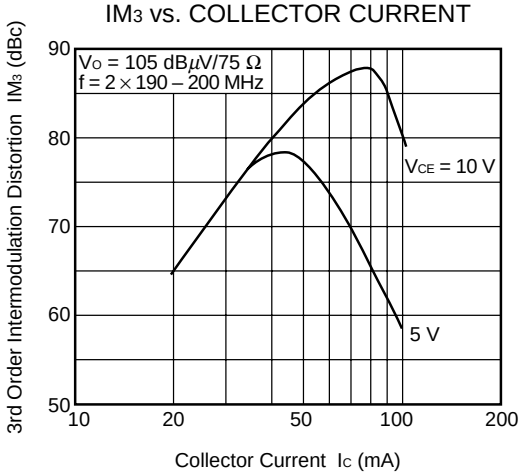
NOISE FIGURE vs.
COLLECTOR CURRENT



IM2 vs. COLLECTOR CURRENT



IM3 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.

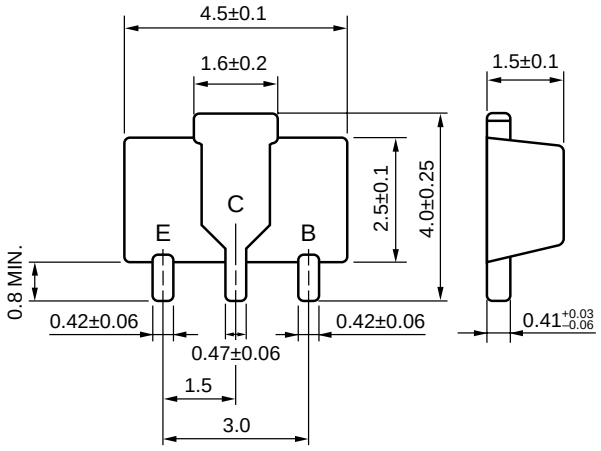
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL http://www.csd-nec.com/

★ **PACKAGE DIMENSIONS**

3-PIN POWER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

E : Emitter
C : Collector (Fin)
B : Base

(IEC : SOT-89)

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▶**For further information, please contact**

NEC Compound Semiconductor Devices, Ltd.
5th Sales Group, Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309 E-mail: ncsd-hk@elhk.nec.com.hk
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH http://www.ee.nec.de/
TEL: +49-211-6503-01 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. http://www.cel.com/
TEL: +1-408-988-3500 FAX: +1-408-988-0279

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