

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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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 ($V_{CE} = 5\text{ V}$). 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: $IM_2 = 55\text{ dBc TYP.}$, $IM_3 = 76\text{ dBc TYP.}$ @ $V_{CE} = 5\text{ V}$, $I_C = 50\text{ mA}$, $V_O = 105\text{ dB}\mu\text{V}/75\Omega$
- Large P_{tot} : $P_{tot} = 1.8\text{ W}$ (Mounted on double-sided copper-clad $16\text{ cm}^2 \times 0.7\text{ mm}$ (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 ($T_A = +25^\circ\text{C}$)

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}	2.5	V
Collector Current	I_C	150	mA
Total Power Dissipation	P_{tot}^{Note}	1.8	W
Junction Temperature	T_j	150	$^\circ\text{C}$
★ Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

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

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} = 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 Intermodulation 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 Intermodulation 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	–	

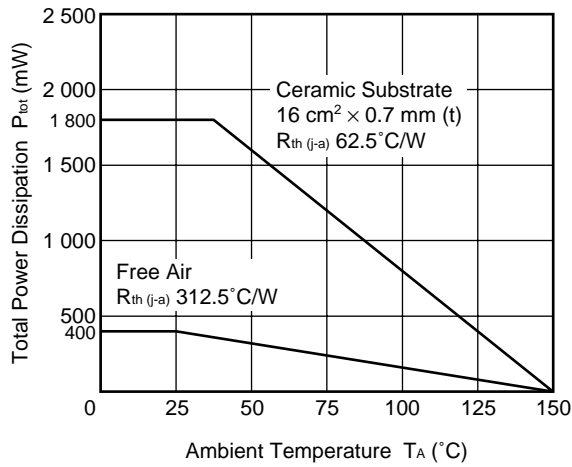
- Notes** 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%
 2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

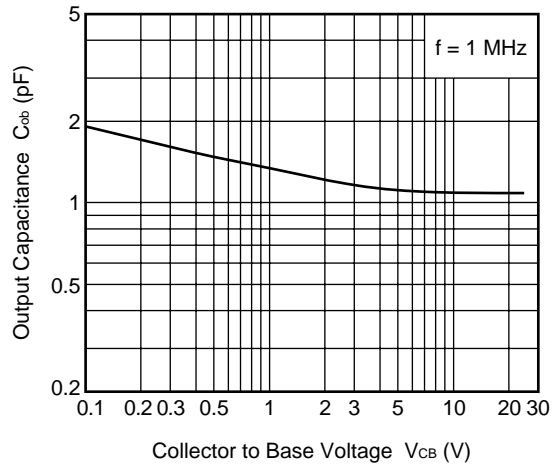
Rank	SH	SF	SE
Marking	SH	SF	SE
h _{FE} Value	50 to 100	80 to 160	125 to 250

★ TYPICAL CHARACTERISTICS (T_A = +25°C)

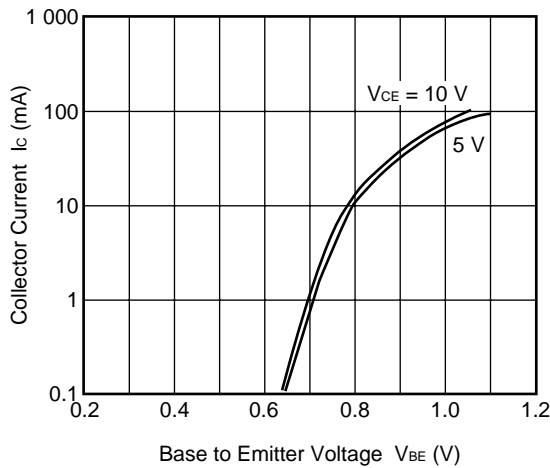
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



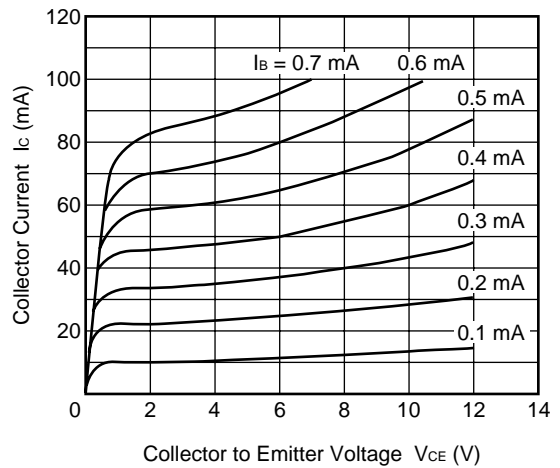
OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



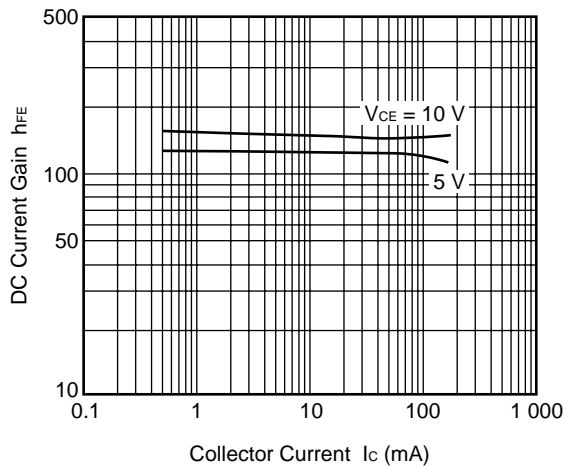
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



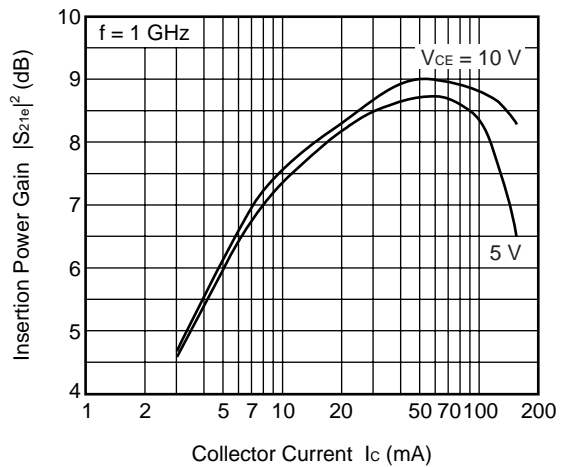
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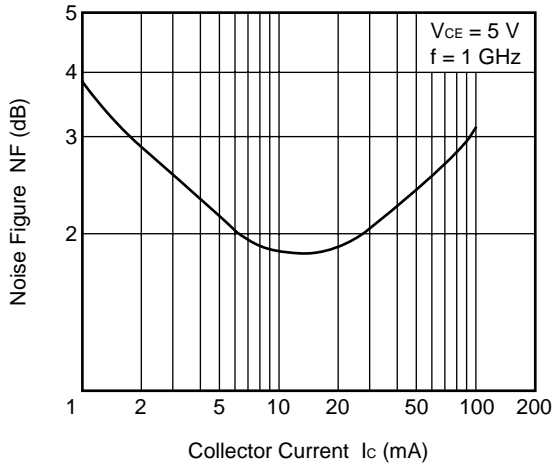
DC CURRENT GAIN vs. COLLECTOR CURRENT



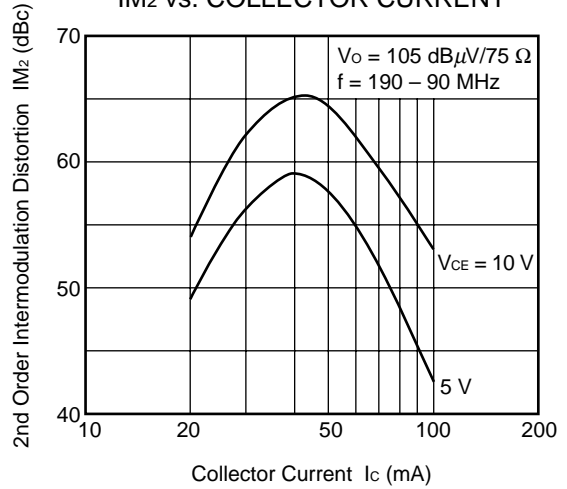
INSERTION POWER GAIN vs. COLLECTOR CURRENT



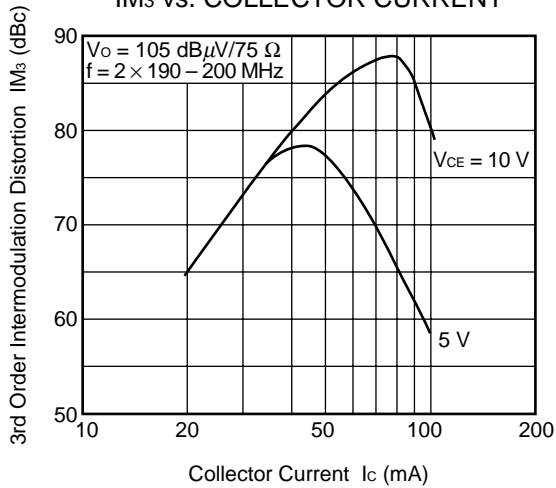
NOISE FIGURE vs. COLLECTOR CURRENT



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.

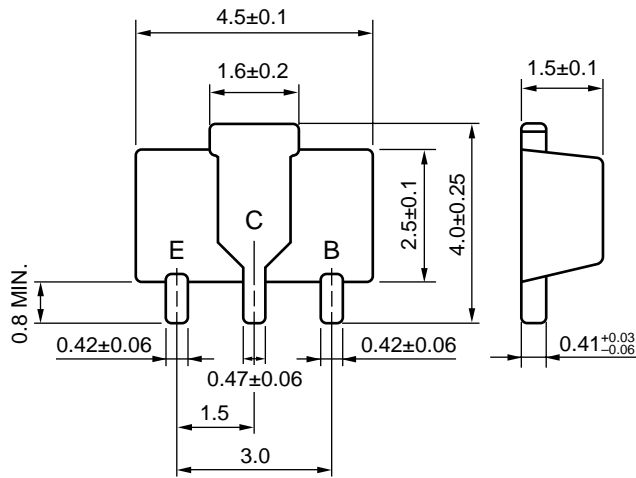
Click here to download S-parameters.

[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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