# Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 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 ( $V_{CE} = 5 V$ ). 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<sub>2</sub> = 55 dBc TYP., IM<sub>3</sub> = 76 dBc TYP. @ Vce = 5 V, Ic = 50 mA, Vo = 105 dB $\mu$ V/75 $\Omega$
- Large Ptot : Ptot = 1.8 W (Mounted on double-sided copper-clad 16 cm<sup>2</sup> × 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 (TA = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	Vсво	25	V
Collector to Emitter Voltage	Vceo	12	V
Emitter to Base Voltage	Vево	2.5	V
Collector Current	lc	150	mA
Total Power Dissipation	Ptot Note	1.8	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to +150	°C

### $\star$

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

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

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# ELECTRICAL CHARACTERISTICS (TA = +25°C)

Parameter	Symbol	Test Conditions		MIN.	TYP.	MAX.	Unit
DC Characteristics							
Collector Cut-off Current	Ісво	V <sub>CB</sub> = 20 V, I <sub>E</sub> = 0 mA		_	-	1.5	μA
Emitter Cut-off Current	Іево	VEB = 2 V, Ic = 0 mA		-	-	1.5	μA
DC Current Gain	hfe Note 1	Vce = 5 V, Ic = 50 mA		50	-	250	-
RF Characteristics							
Gain Bandwidth Product	f⊤	Vce = 5 V, Ic = 50 mA		I	6.0	-	GH
Insertion Power Gain (1)	S <sub>21e</sub>   <sup>2</sup>	Vce = 5 V, Ic = 50 mA, f = 1 GHz		6.5	8.3	_	dB
Insertion Power Gain (2)	S <sub>21e</sub>   <sup>2</sup>	Vce = 10 V, Ic = 20 mA, f = 1 GHz		I	8.5	-	dB
Noise Figure	NF	Vce = 5 V, Ic = 50 mA, f = 1 GHz		Ι	2.3	3.5	dB
Collector Capacitance	Cob Note 2	Vсв = 5 V, IE = 0 mA, f = 1 MHz		I	1.5	2.5	pF
2nd Order Intermoduration Distortion	IM2	lc = 50 mA, Vo = 105 dBμV/75 Ω, f = 190 – 90 MHz	$V_{CE} = 5 V$	-	55	-	dBo
			Vce = 10 V		63	-	
3rd Order Intermoduration Distortion	IМз	Ic = 50 mA, Vo = 105 dB $\mu$ V/75 Ω, f = 2 × 190 – 200 MHz	Vce = 5 V	-	76	-	dBo
			Vce = 10 V	-	81	-	

**Notes 1.** Pulse measurement: PW  $\leq$  350  $\mu$ s, Duty Cycle  $\leq$  2%

2. Collector to base capacitance when the emitter grounded

# **hfe CLASSIFICATION**

Rank	SH	SF	SE
Marking	SH	SF	SE
hfe Value	50 to 100	80 to 160	125 to 250

f = 1 MHz

Ŧ₩

2 3

Iв = 0.7 mA

4

6

5 7 10

20

8

10

1

5

10

0.6 mA

0.5 mA

0.4 mA

0.3 mA

0.2 mA

0.1 mA

14

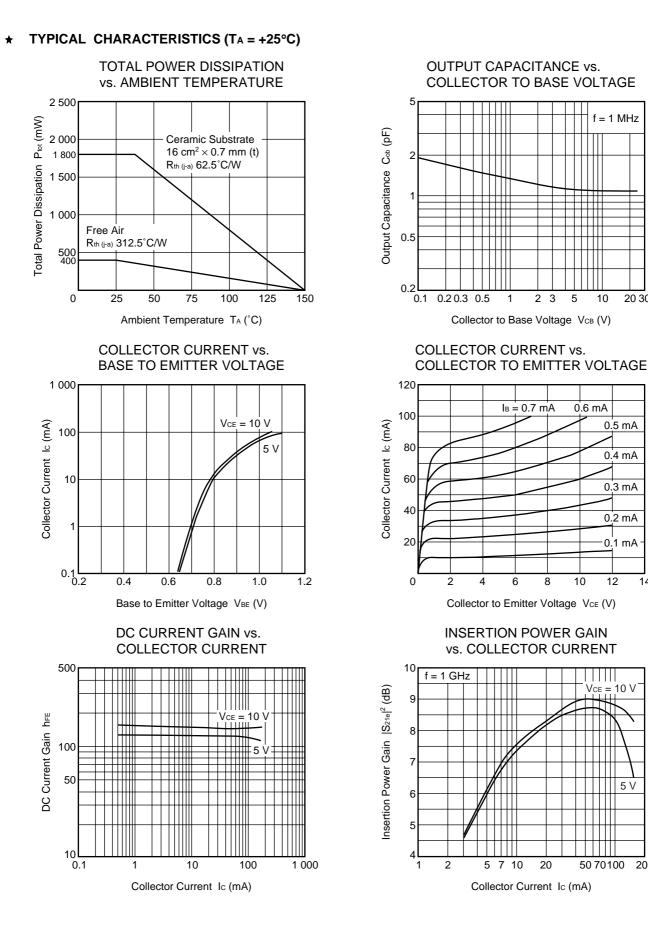
12

50 70 100

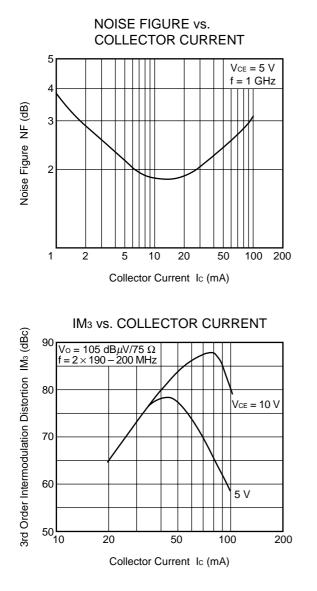
Vce = 10 V

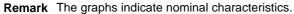
5 V

20 30



200





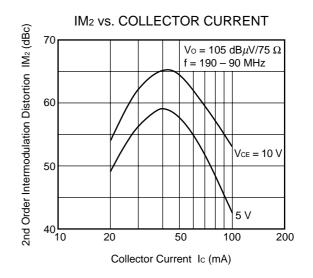
# **S-PARAMETERS**

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.

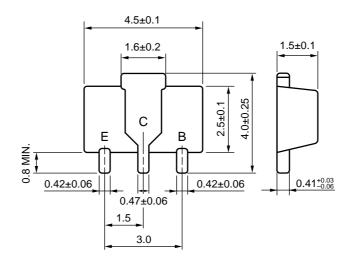
 $[\mathsf{RF} \text{ and Microwave}] \rightarrow [\mathsf{Device Parameters}]$ 

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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