

NPN SILICON RF TRANSISTOR 2SC4093

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

DESCRIPTION

The 2SC4093 is an NPN silicon epitaxial transistor designed for low noise amplifier at VHF, UHF and CATV band. It has large dynamic range and good current characteristics, and is contained in a 4-pin minimold package which enables high-isolation gain.

FEATURES

Low Noise

NF = 1.1 dB TYP. @ Vce = 10 V, Ic = 7 mA, f = 1 GHz

· High Power gain

 $|S_{21e}|^2 = 13 \text{ dB TYP.}$ @ VcE = 10 V, Ic = 20 mA, f = 1 GHz

- Maximum available power gain: MAG = 14.2 dB TYP. @ Vce = 10 V, Ic = 20 mA, f = 1 GHz
- 4-pin minimold Package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
2SC4093	50 pcs (Non reel)	8 mm wide embossed taping
2SC4093-T1	3 kpcs/reel	Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape

Remark To order evaluation samples, contact your nearby sales office.

The unit sample quantity is 50 pcs.

ABSOLUTE MAXIMUM RATINGS (TA = +25°C)

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	Vceo	12	V
Emitter to Base Voltage	VEBO	3.0	V
Collector Current	lc	100	mA
Total Power Dissipation	Ptot Note	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to +150	°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.

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ELECTRICAL CHARACTERISTICS (TA = +25°C)

Parameter	Symbol	bol Test Conditions		TYP.	MAX.	Unit	
DC Characteristics							
Collector Cut-off Current	Ісво	Iсво Vсв = 10 V, IE = 0 mA		-	1.0	μΑ	
Emitter Cut-off Current	ІЕВО	VEB = 1 V, Ic = 0 mA	_	=	1.0	μΑ	
DC Current Gain	hfe Note 1	VcE = 10 V, Ic = 20 mA	50	120	250	-	
RF Characteristics							
Gain Bandwidth Product	f⊤	VcE = 10 V, Ic = 20 mA	-	7.0	-	GHz	
Insertion Power Gain	S _{21e} ²	VcE = 10 V, Ic = 20 mA, f = 1.0 GHz	11	13	-	dB	
Noise Figure	NF	VcE = 10 V, Ic = 7 mA, f = 1.0 GHz	-	1.1	2.0	dB	
Reverse Transfer Capacitance	Cre Note 2	VcB = 10 V, IE = 0 mA, f = 1.0 MHz	-	0.6	0.95	pF	

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

2. Collector to base capacitance when the emitter grounded

hfe CLASSIFICATION

Rank	R26/RBF Note	R27/RBG Note	R28/RBH Note
Marking	R26	R27	R28
Range	50 to 100	80 to 160	125 to 250

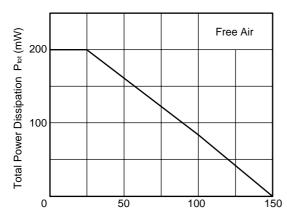
Note Old Specification / New Specification

2



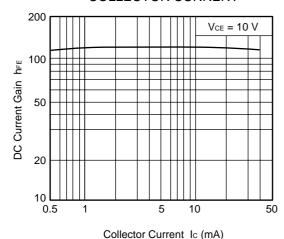
TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE

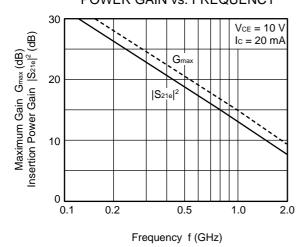


Ambient Temperature TA (°C)

DC CURRENT GAIN vs. **COLLECTOR CURRENT**

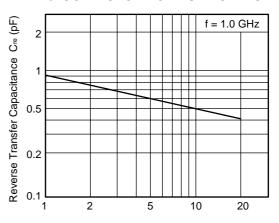


MAXIMUM GAIN/INSERTION POWER GAIN vs. FREQUENCY



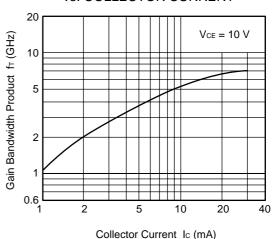
Remark The graphs indicate nominal characteristics.

REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



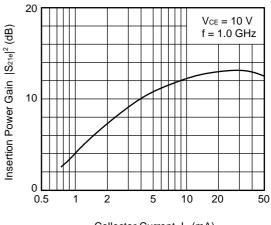
Collector to Base Voltage VcB (V)

GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



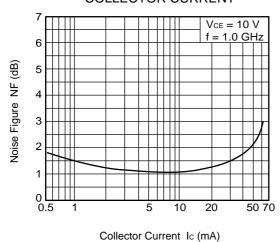
INSERTION POWER GAIN

vs. COLLECTOR CURRENT



Collector Current Ic (mA)

NOISE FIGURE vs. COLLECTOR CURRENT



Remark The graph indicates 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.

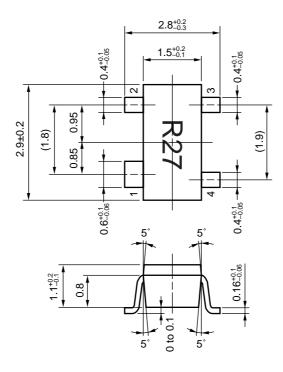
Click here to download S-parameters.

[RF and Microwave] \rightarrow [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

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