

# SILICON TRANSISTOR 2SC4093

# MICROWAVE LOW NOISE AMPLIFIER NPN SILICON EPITAXIAL TRANSISTOR 4 PINS MINI MOLD

#### **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 characteritics, and is contatined in a 4 pins mini-mold package which enables high-isolation gain.

## **FEATURES**

· Low Noise

NF = 1.1 dB TYP. @ VCE = 10 V, Ic = 7 mA, f = 1.0 GHz

· High Power Gains

 $|S_{21e}|^2 = 13 \text{ dB TYP.}$  @ VcE = 10 V, Ic = 20 mA, f = 1.0 GHz

#### **ORDERING INFORMATION**

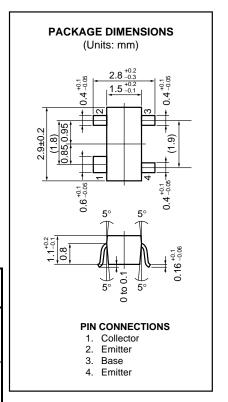
PART NUMBER	QUANTITY	PACKING STYLE
2SC4093-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Base), Pin4 (Emitter) face to perforation side of the tape.
2SC4093-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Collector), Pin2 (Emitter) face to perforation side of the tape.

<sup>\*</sup> Please contact with responsible NEC person, if you require evaluation sample.

Unit sample quantity shall be 50 pcs. (Part No.: 2SC4093)

## ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	VCEO	12	V
Emitter to Base Voltage	Vево	3.0	V
Collector Current	Ic	100	mΑ
Total Power Dissipation	Рт	200	mW
Junction Temperature	$T_j$	150	°C
Storage Temperature	Tstg	-65 to +150	°C





# **ELECTRICAL CHARACTERISTICS (TA = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	Ісво			1.0	μА	Vcb = 10 V, IE = 0
Emitter Cutoff Current	ІЕВО			1.0	μА	V <sub>EB</sub> = 10 V, I <sub>C</sub> = 0
DC Current Gain	hfe	50	120	250		VcE = 10 V, Ic = 20 mA
Gain Bandwidth Product	f⊤		7.0		GHz	Vce = 10 V, Ic = 20 mA
Feed-Back Capacitance	Cre		0.6	0.95	pF	Vcb = 10 V, IE = 0, f = 1.0 MHz
Insertion Power Gain	S <sub>21e</sub> 2	11	13		dB	Vce = 10 V, Ic = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.1	2.0	dB	Vce = 10 V, Ic = 7 mA, f = 1.0 GHz

## Classification of hee

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

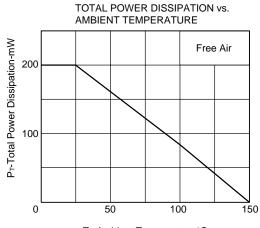
<sup>\*</sup> Old Specification / New Specification

her Test Condtitions: Vce = 10 V, Ic = 20 mA

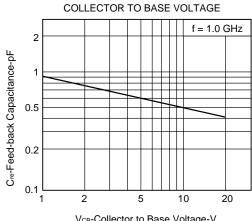
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## TYPICAL CHARACTERISTICS (TA = 25 °C)

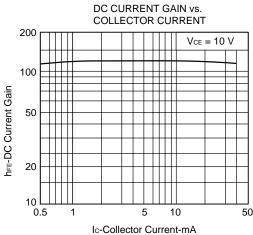


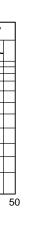




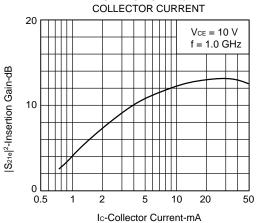
FEED-BACK CAPACITANCE vs.

VcB-Collector to Base Voltage-V

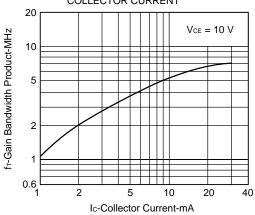




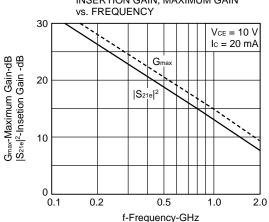
INSERTION GAIN vs.

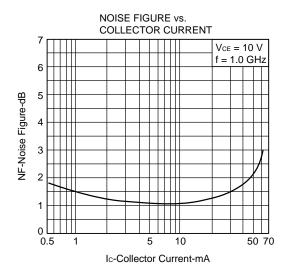


GAIN BANDWIDTH PRODUUT vs. COLLECTOR CURRENT 20



INSERTION GAIN, MAXIMUM GAIN





## **S-PARAMETER**

Vce =10 V, Ic = 5 mA, Zo = 50  $\Omega$ 

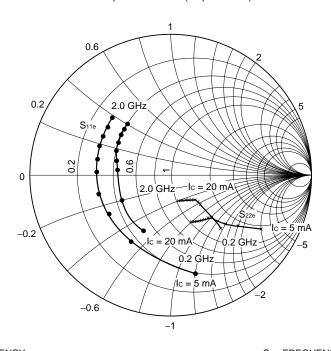
f (MHz)	S <sub>11</sub>	∠ <b>S</b> 11	S <sub>21</sub>	∠ <b>S</b> 21	S <sub>12</sub>	∠ <b>S</b> 12	S <sub>22</sub>	∠ <b>S</b> 22
200	0.730	-76.5	11.712	129.6	0.048	47.2	0.772	-28.1
400	0.583	-118.8	7.379	105.6	0.056	43.2	0.600	-34.9
600	0.522	-146.2	5.551	92.2	0.072	38.6	0.526	-37.7
800	0.518	-166.5	4.026	80.8	0.072	40.5	0.471	-39.8
1000	0.519	178.3	3.406	71.9	0.088	40.5	0.441	-41.6
1200	0.539	166.6	2.744	63.1	0.089	44.3	0.428	-45.4
1400	0.552	157.4	2.512	55.2	0.106	45.6	0.406	-49.4
1600	0.555	149.0	2.122	48.5	0.111	44.8	0.388	-56.1
1800	0.570	140.9	2.028	41.9	0.134	49.3	0.380	-61.8
2000	0.582	134.0	1.740	36.4	0.135	47.3	0.367	-68.0

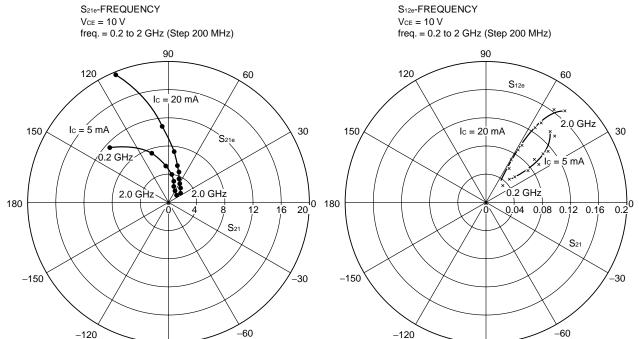
Vce = 10 V, Ic = 20 mA, Zo = 50  $\Omega$ 

f (MHz)	S <sub>11</sub>	∠ <b>S</b> 11	S <sub>21</sub>	∠ <b>S</b> 21	S <sub>12</sub>	∠ <b>S</b> 12	S22	∠ S <sub>22</sub>
200	0.454	-114.9	19.635	111.0	0.033	46.1	0.497	-42.5
400	0.395	-153.0	10.412	93.3	0.041	58.1	0.359	-41.2
600	0.384	-172.8	7.454	84.4	0.060	55.6	0.315	-41.0
800	0.408	173.4	5.318	75.5	0.073	61.1	0.283	-42.5
1000	0.420	162.6	4.450	68.8	0.094	58.2	0.256	-43.2
1200	0.442	154.7	3.571	61.4	0.103	58.7	0.247	-47.8
1400	0.455	147.7	3.253	54.6	0.127	55.3	0.227	-53.0
1600	0.468	141.2	2.737	49.0	0.137	53.1	0.212	-62.2
1800	0.486	133.9	2.618	43.0	0.165	52.1	0.198	-67.4
2000	0.502	128.7	2.237	38.4	0.170	48.4	0.186	-75.5

### **S-PARAMETER**

 $S_{11e}, S_{22e}$ -FREQUENCY  $V_{CE} = 10 \text{ V}$  freq. = 0.2 to 2 GHz (Step 200 MHz)





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Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.

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