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NEC

SILICON TRANSISTOR
2SC4092

HIGH FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
4 PINS MINI MOLD

DESCRIPTION

The 2SC4092 is an NPN silicon epitaxial transistor designed for low-noise amplifier at VHF, UHF band.

It is contained in 4 pins mini-mold package which enables high-isolation gain.

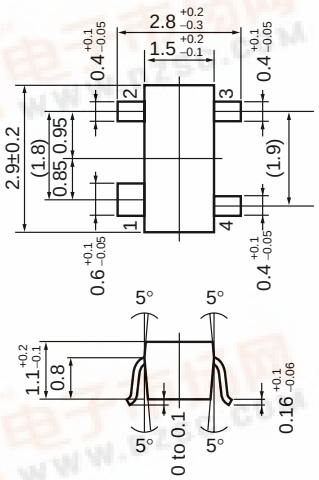
FEATURES

- NF = 1.5 dB TYP. @f = 1.0 GHz, V_{CE} = 10 V, I_C = 5 mA
- $|S_{21e}|^2$ = 12 dB TYP. @f = 1.0 GHz, V_{CE} = 10 V, I_C = 20 mA

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Collector to Base Voltage	V_{CBO}	25	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	70	mA
Total Power Dissipation	P_T	200	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

PACKAGE DIMENSIONS
(Units: mm)



PIN CONNECTIONS

1. Collector
2. Emitter
3. Base
4. Emitter

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			0.1	μA	V_{CB} = 15 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			0.1	μA	V_{EB} = 2.0 V, I_C = 0
DC Current Gain	h_{FE}	40		200		V_{CE} = 10 V, I_C = 20 mA
Gain Bandwidth Product	f_T		6		GHz	V_{CE} = 10 V, I_C = 20 mA f = 1.0 GHz
Output Capacitance	C_{ob}		0.55	0.9	pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz
Insertion Power Gain	$\|S_{21e}\|^2$	9.5	12		dB	V_{CE} = 10 V, I_C = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.5	3.0	dB	V_{CE} = 10 V, I_C = 5 mA, f = 1.0 GHz
Maximum Available Gain	MAG		14.5		dB	V_{CE} = 10 V, I_C = 20 mA, f = 1.0 GHz

h_{FE} Classification

Class	R4/RD *	R5/RE *
Marking	R4	R5
h_{FE}	40 to 120	100 to 200

* Old Specification / New Specification

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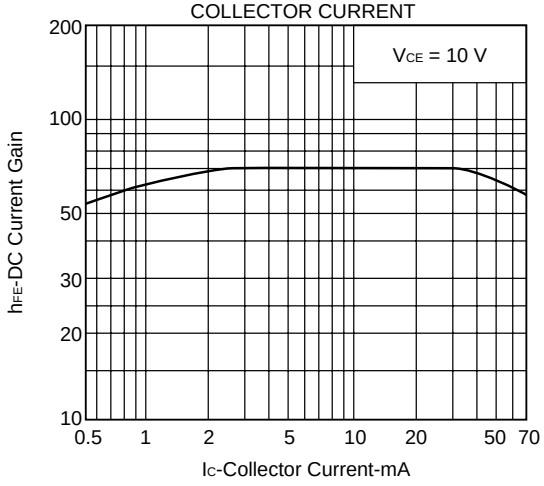
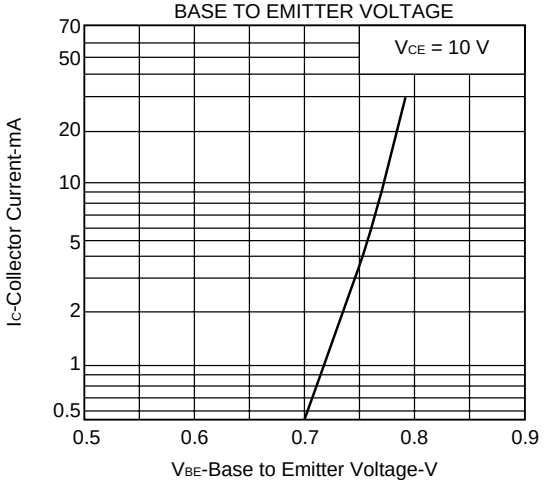
TYPICAL CHARACTERISTICS (T_A = 25 °C)

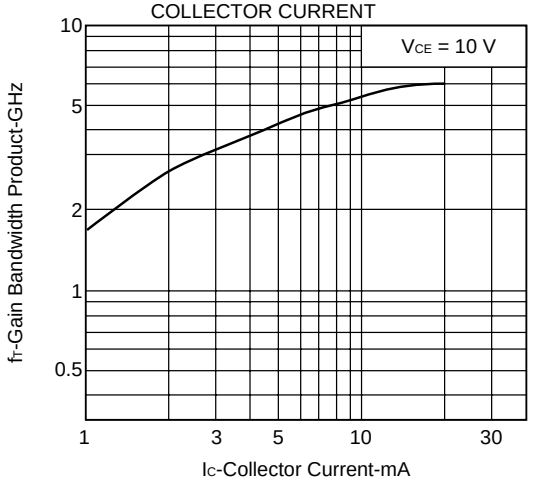
DC CURRENT GAIN vs.
COLLECTOR CURRENT



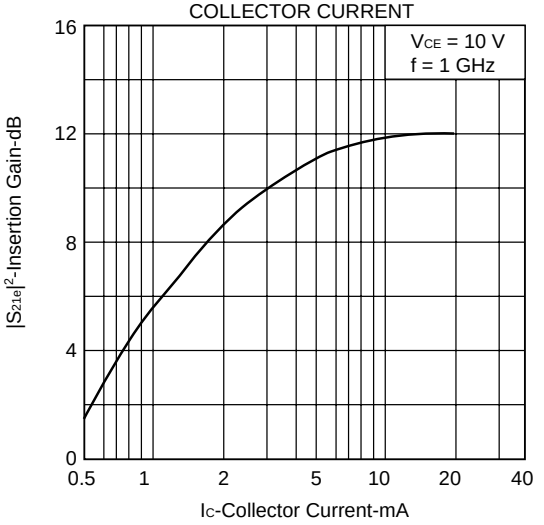
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



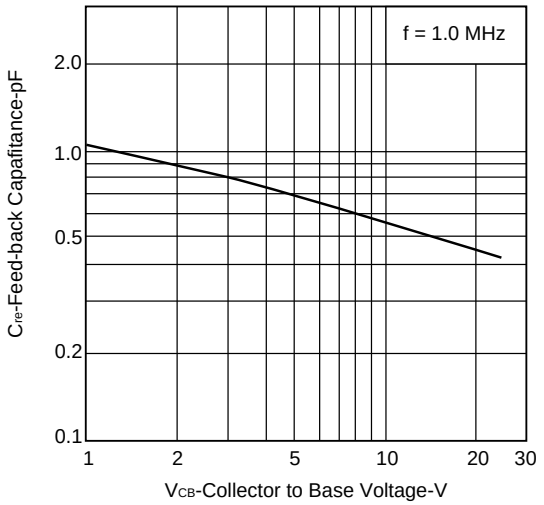
GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT



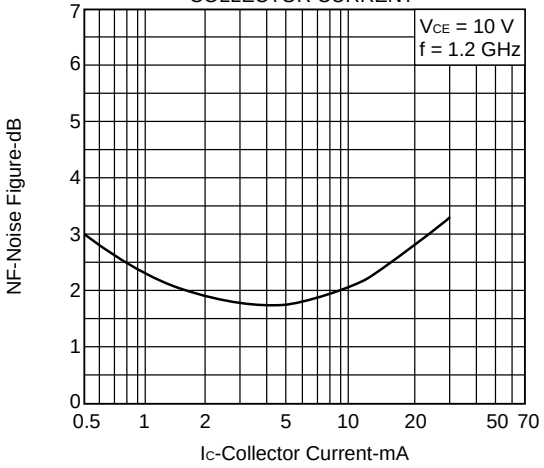
INSERTION GAIN vs.
COLLECTOR CURRENT

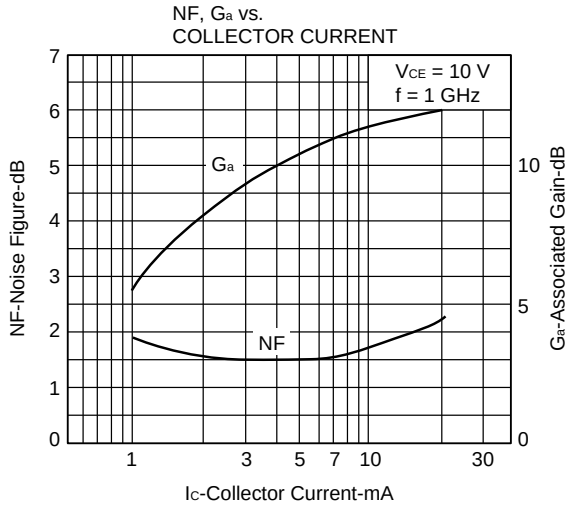


FEED-BACK CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



NOISE FIGURE.
COLLECTOR CURRENT





S-PARAMETER

V_{CE} = 10 V, I_C = 5 mA, Z_O = 50 Ω

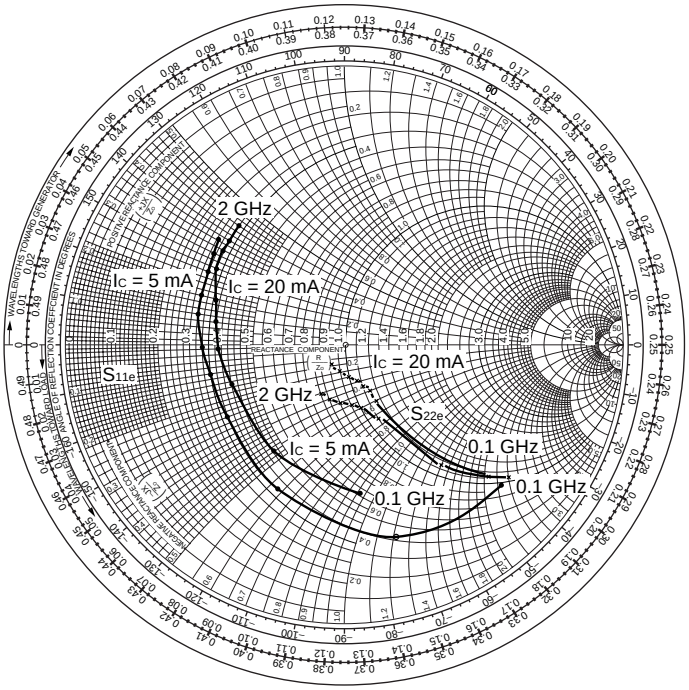
f (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.780	–39.4	13.956	155.8	0.027	62.9	0.905	–21.2
200	0.709	–73.6	11.808	130.8	0.058	62.3	0.767	–36.3
400	0.567	–114.4	7.509	106.5	0.081	42.1	0.542	–50.3
600	0.503	–143.3	5.678	93.2	0.093	39.0	0.424	–56.2
800	0.486	–164.3	4.155	80.6	0.104	36.8	0.353	–59.3
1000	0.488	–179.5	3.499	72.3	0.117	37.2	0.301	–63.1
1200	0.506	167.5	2.830	63.0	0.129	36.6	0.265	–66.1
1400	0.520	159.9	2.588	55.3	0.144	35.9	0.246	–73.4
1600	0.528	149.8	2.188	48.5	0.155	37.5	0.217	–79.1
1800	0.533	141.8	2.092	41.7	0.173	35.7	0.209	–88.0
2000	0.556	134.9	1.794	36.0	0.181	36.1	0.192	–97.8

V_{CE} = 10 V, I_C = 5 mA, Z_O = 50 Ω

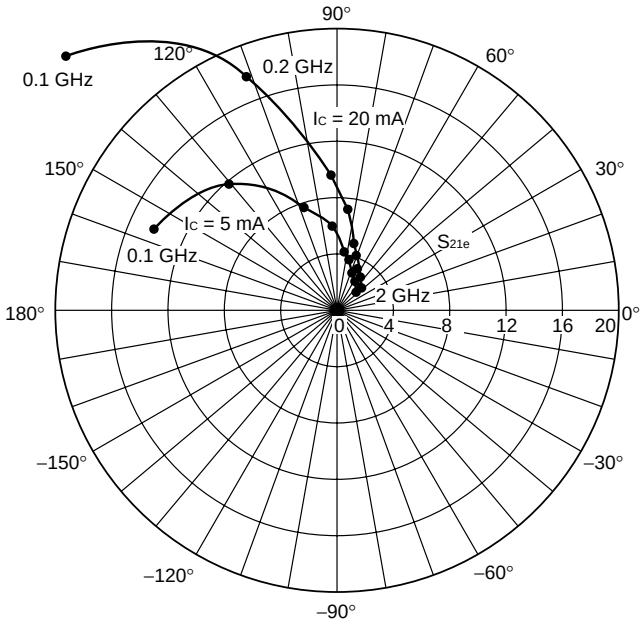
f (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.534	–82.1	25.861	136.3	0.021	34.8	0.717	–41.1
200	0.468	–121.0	17.231	110.2	0.033	60.5	0.481	–50.5
400	0.428	–157.0	9.440	92.4	0.051	50.1	0.297	–57.8
600	0.435	–176.6	6.738	83.4	0.069	57.2	0.230	–59.5
800	0.448	170.0	4.823	73.7	0.090	54.6	0.197	–60.9
1000	0.464	161.0	4.013	67.2	0.107	54.1	0.164	–66.3
1200	0.480	152.1	3.232	59.4	0.127	53.5	0.140	–70.7
1400	0.495	146.5	2.945	52.7	0.149	49.6	0.131	–80.5
1600	0.511	138.9	2.480	46.9	0.164	49.5	0.104	–91.4
1800	0.517	132.7	2.364	40.9	0.187	45.2	0.104	–103.7
2000	0.546	127.0	2.024	35.9	0.197	44.3	0.094	–120.7

S-PARAMETER

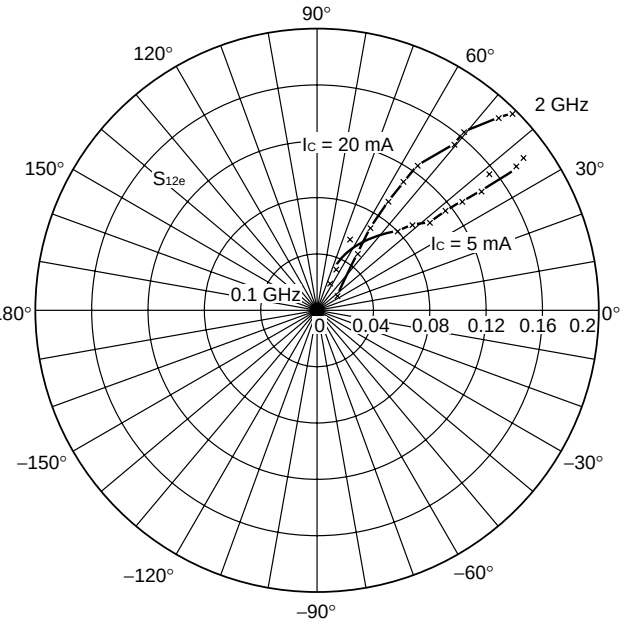
S_{11e}, S_{22e}-FREQUENCY CONDITION V_{CE} = 10 V, f = 0.1, 0.2 to 2.0 GHz (Step 200 MHz)



S_{21e}-FREQUENCY CONDITION V_{CE} = 10 V



S_{12e}-FREQUENCY CONDITION V_{CE} = 10 V



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Anti-radioactive design is not implemented in this product.

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