Ordering number:EN5295A

NPN Epitaxial Planar Silicon Transistor

2SC4931

VHF to UHF Wide-Band Low-Noise Amplifier Applications

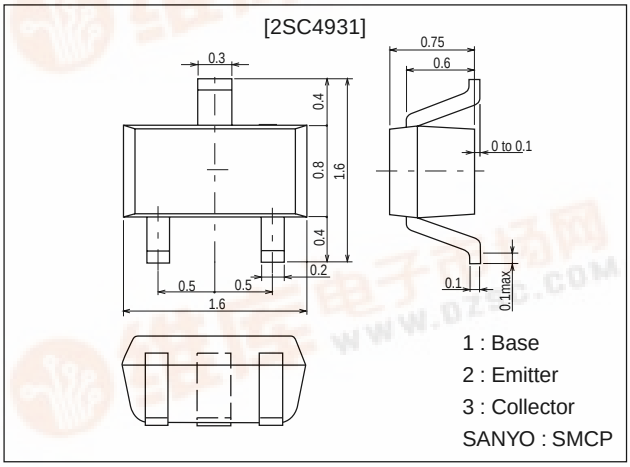
Features

- Low noise : NF=1.2dB typ (f=1GHz).
- High gain : $|S21e|^2$=13dB typ (f=1GHz).
- High cutoff frequency : f_T=9.0GHz typ.
- Very small-sized package permitting 2SC4931-applied sets to be made small and slim.

Package Dimensions

unit:mm

2106A



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		16	V
Collector-to-Emitter Voltage	V_{CEO}		8	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		50	mA
Collector Dissipation	P_C		100	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

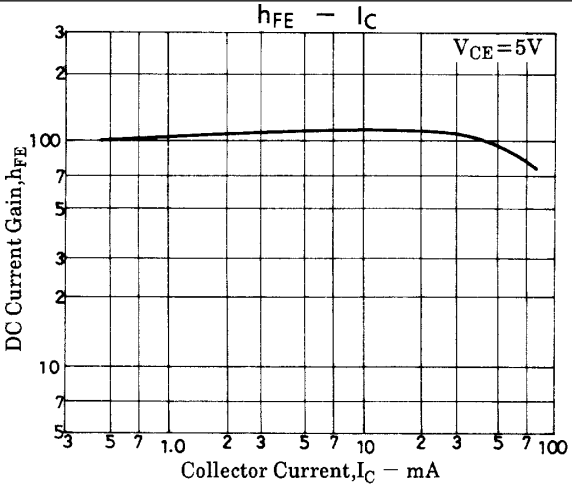
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=15mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=15mA		9.0		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.55	1.2	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=15mA, f=1GHz	10	13		dB
Noise Figure	NF	V_{CE}=5V, I_C=5mA, f=1GHz		1.2	2.5	dB

* : The 2SC4931 is classified by 15mA h_{FE} as follows :

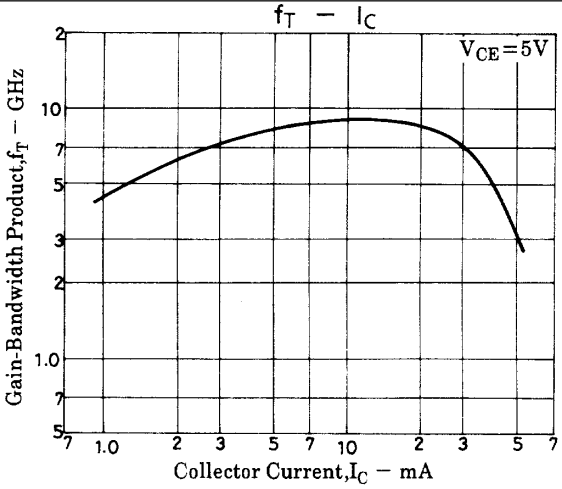
Marking	B1	B2	B3
h_{FE}	60 to 120	90 to 180	135 to 270

SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

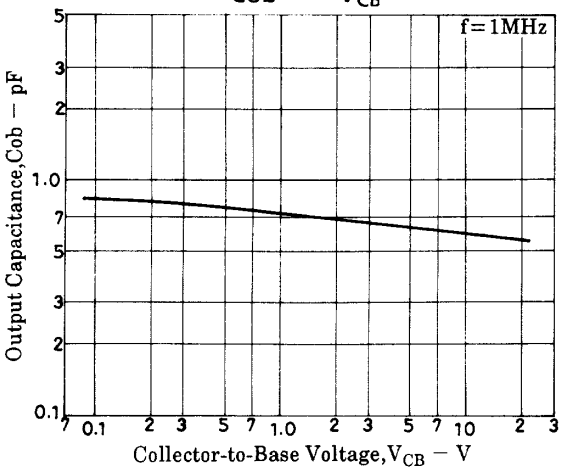
h_{FE} – I_C



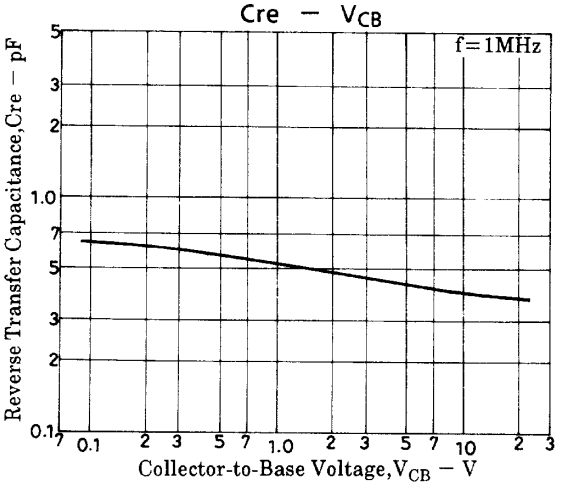
f_T – I_C



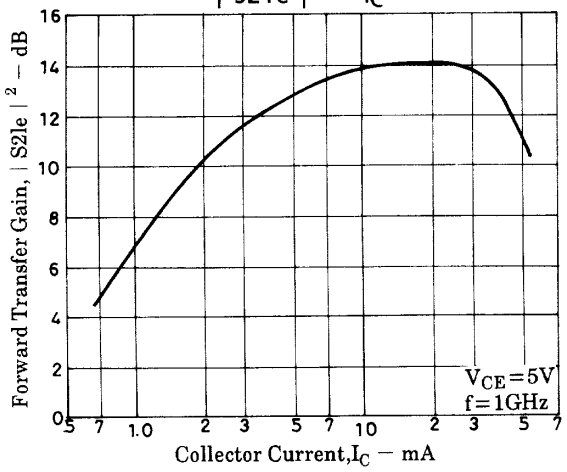
Cob – V_{CB}



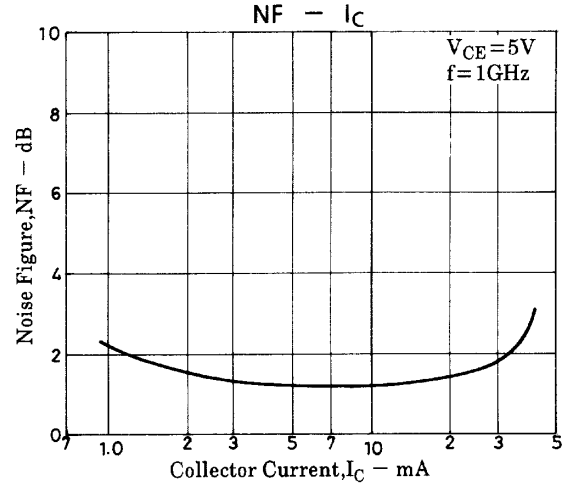
Cre – V_{CB}



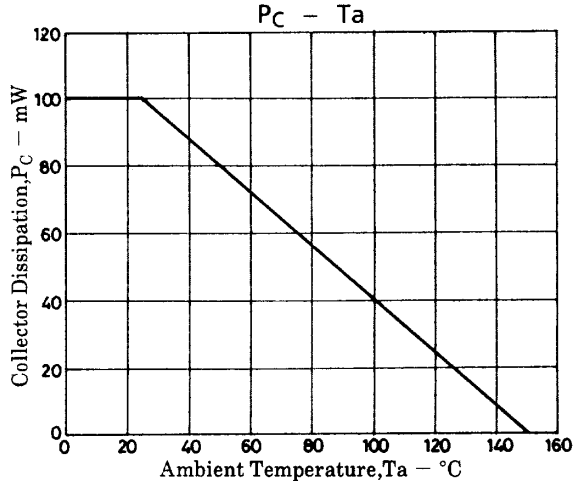
$|S21e|^2$ – I_C



NF – I_C

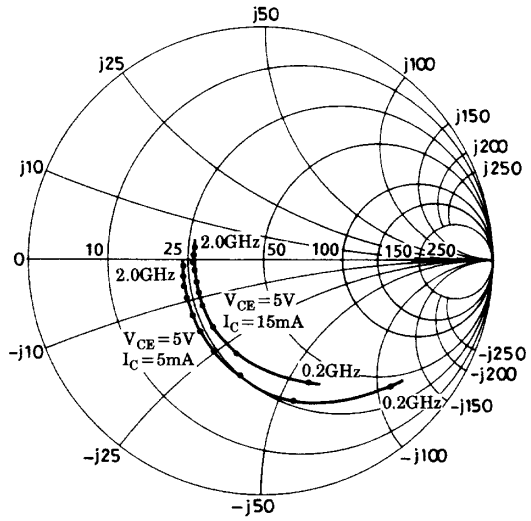


P_C – Ta



S parameter

S11e
f = 200 to 2000MHz (200MHz Step)



S12e
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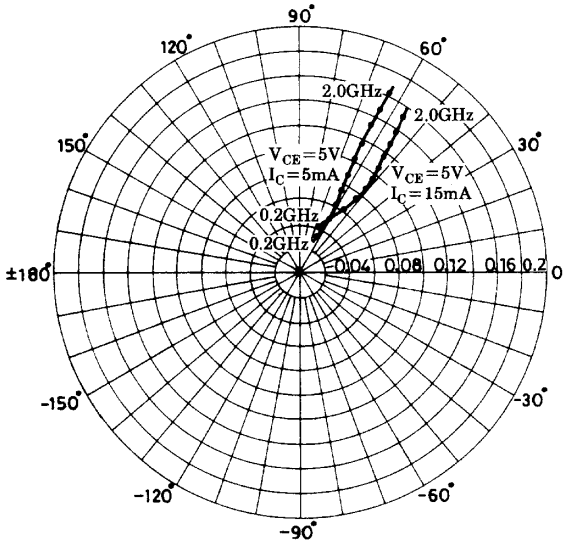
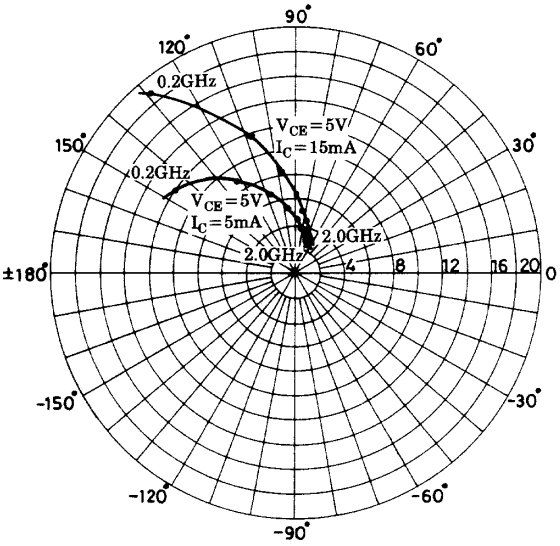
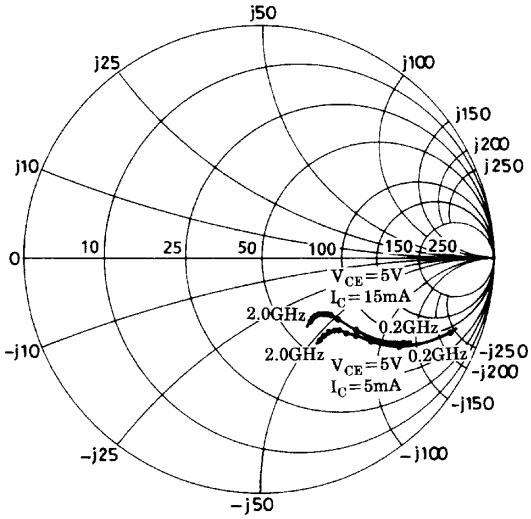


S21e
f = 200 to 2000MHz (200MHz Step)



S22e
f = 200 to 2000MHz (200MHz Step)



S parameter (Common emitter)

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.775	–45.2	11.958	144.8	0.040	67.3	0.872	–21.4
400	0.620	–78.1	8.989	122.3	0.063	56.2	0.704	–32.1
600	0.517	–100.9	6.908	107.9	0.076	52.2	0.594	–36.7
800	0.451	–117.9	5.487	97.6	0.087	51.3	0.529	–39.2
1000	0.411	–131.5	4.553	89.8	0.097	51.9	0.491	–40.9
1200	0.385	–142.0	3.899	83.4	0.107	52.7	0.467	–42.5
1400	0.372	–152.5	3.411	77.3	0.117	53.7	0.451	–44.1
1600	0.364	–161.7	3.052	71.3	0.129	54.7	0.438	–46.2
1800	0.353	–168.5	2.740	66.7	0.139	55.4	0.435	–48.8
2000	0.349	–176.6	2.507	62.7	0.152	56.2	0.435	–51.2

V_{CE}=5V, I_C=15mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.560	–70.0	19.044	129.1	0.032	63.2	0.710	–31.1
400	0.422	–106.3	11.887	108.4	0.048	59.7	0.515	–37.2
600	0.364	–127.3	8.449	97.5	0.061	61.3	0.430	–37.9
800	0.330	–143.0	6.510	89.6	0.075	62.5	0.391	–38.8
1000	0.315	–153.4	5.285	83.6	0.089	63.5	0.371	–39.7
1200	0.306	–161.8	4.484	78.4	0.103	64.1	0.360	–41.0
1400	0.302	–170.7	3.898	73.4	0.118	64.2	0.352	–42.7
1600	0.309	–178.5	3.464	68.5	0.133	64.0	0.346	–45.1
1800	0.302	176.0	3.094	64.7	0.147	63.6	0.344	–48.0
2000	0.299	170.6	2.828	61.2	0.163	63.1	0.348	–50.8