Ordering number:EN4760

NPN Epitaxial Planar Silicon Transistor

2SC4865

VHF to UHF Wide-Band Low-Noise Amplifier Applications

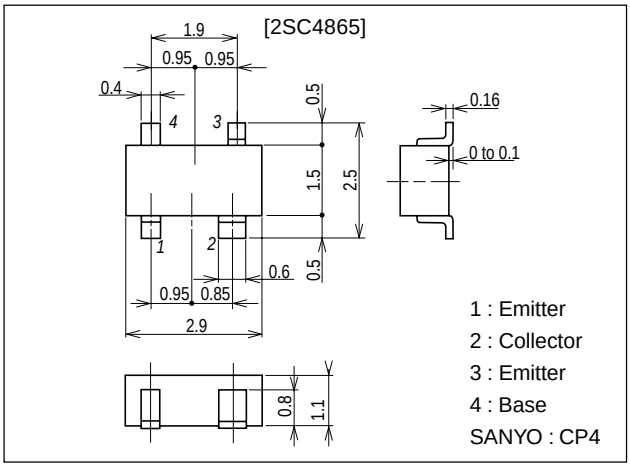
Features

- Low noise : NF=1.1dB typ (f=1GHz).
- High gain : $|S21e|^2$=12.5dB typ (f=1GHz).
- High cutoff frequency : f_T=7.0GHz typ.

Package Dimensions

unit:mm

2110A



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}		2	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C		200	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=20mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=20mA		7.0		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.95	1.4	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=20mA, f=1GHz	8.5	12.5		dB
Noise Figure	NF	V_{CE}=5V, I_C=7mA, f=1GHz		1.1	2.0	dB

* : The 2SC4865 is classified by 20mA h_{FE} as follows :

60	3	120	90	4	180	135	5	270

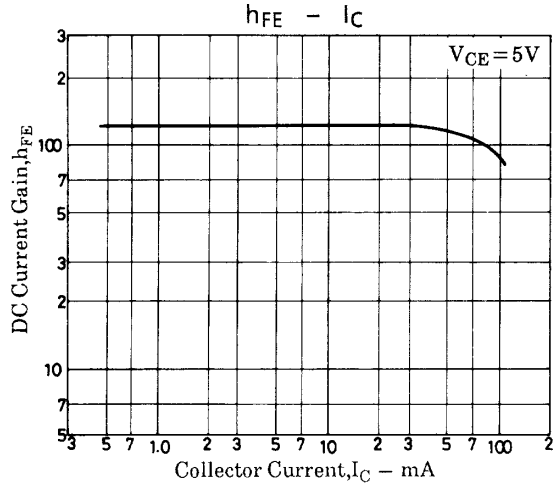
Marking : FN

h_{FE} rank : 3, 4, 5

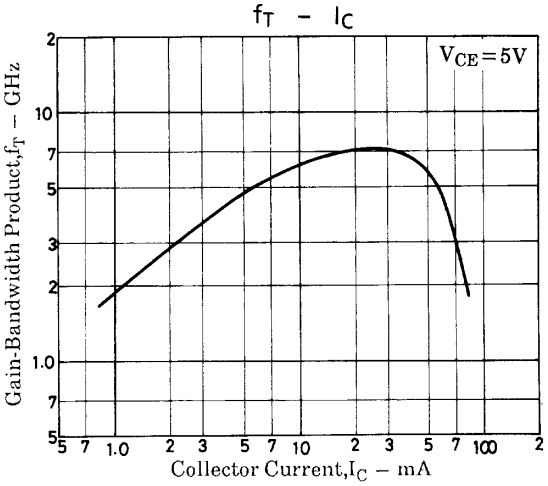
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

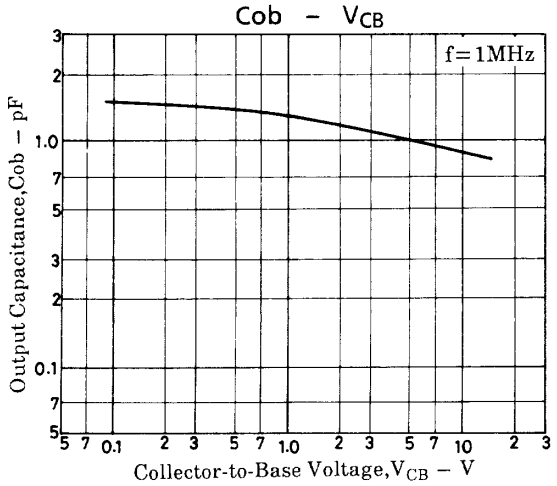
h_{FE} – I_C



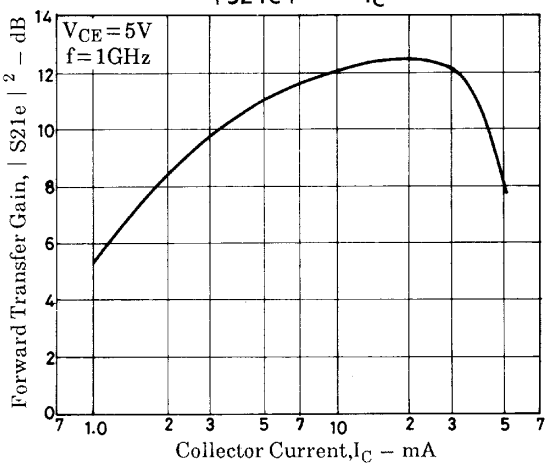
f_T – I_C



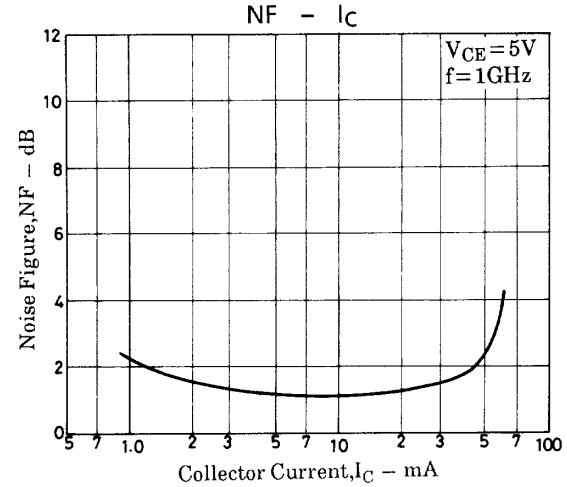
Cob – V_{CB}



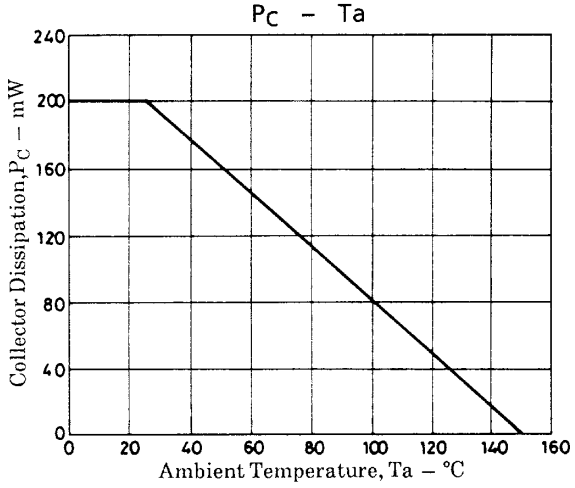
$|S21e|^2$ – I_C



NF – I_C

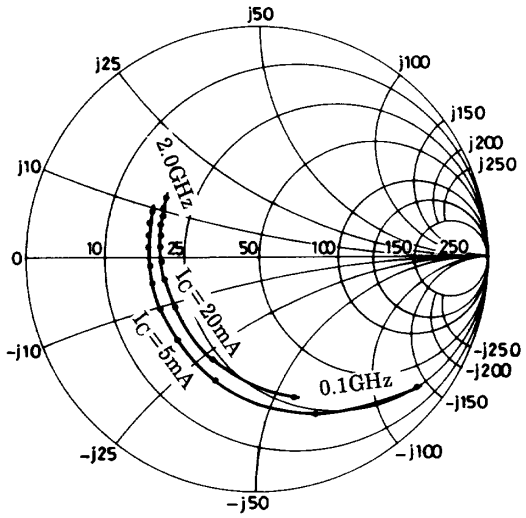


P_C – Ta

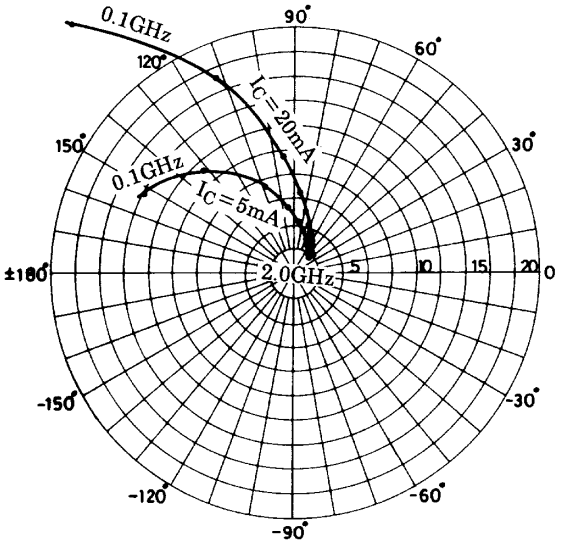


S parameter

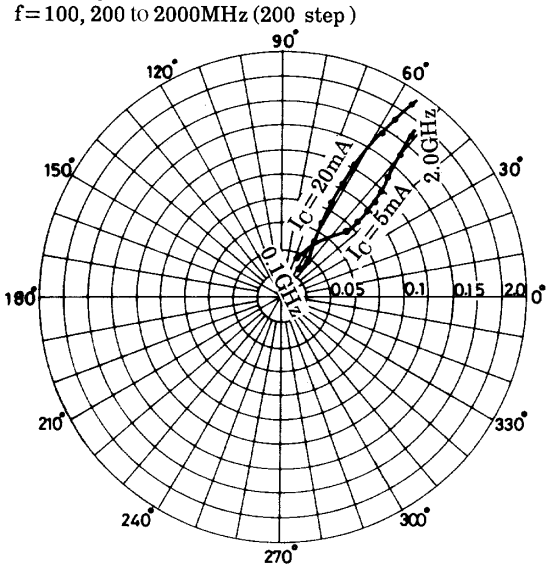
S11e : V_{CE} = 5V
f = 100, 200 to 2000MHz (200 step)



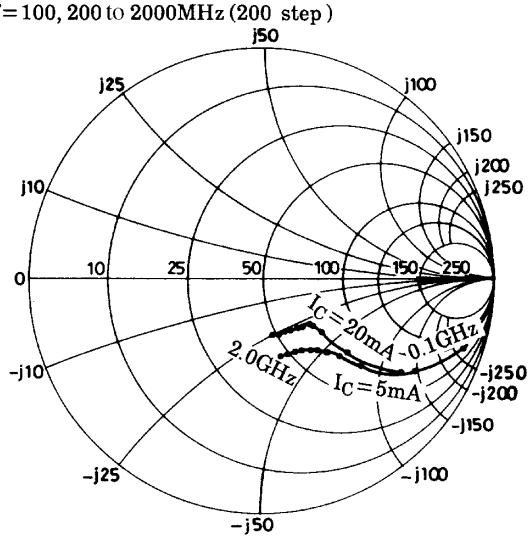
S21e : V_{CE} = 5V
f = 100, 200 to 2000MHz (200 step)



S12e : V_{CE} = 5V
f = 100, 200 to 2000MHz (200 step)



S22e : V_{CE} = 5V
f = 100, 200 to 2000MHz (200 step)



S parameter (Common emitter)

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.860	–40.0	13.912	152.74	0.034	67.2	0.904	–19.7
200	0.705	–71.2	11.185	132.28	0.054	54.3	0.748	–32.0
400	0.551	–110.99	7.426	109.5	0.074	45.9	0.555	–42.8
600	0.494	–135.61	5.385	95.9	0.086	44.0	0.461	–47.2
800	0.484	–152.6	4.241	86.1	0.097	44.9	0.413	–50.1
1000	0.473	–166.0	3.505	77.7	0.107	45.5	0.385	–54.0
1200	0.478	–176.2	2.993	70.2	0.118	46.7	0.368	–57.2
1400	0.484	175.5	2.617	63.4	0.129	47.8	0.353	–62.5
1600	0.484	168.9	2.329	57.4	0.140	49.3	0.347	–66.8
1800	0.498	163.3	2.102	52.6	0.151	50.0	0.339	–72.2
2000	0.504	156.9	1.946	47.3	0.167	50.8	0.340	–77.5

V_{CE}=5V, I_C=20mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.607	–77.0	27.348	132.4	0.025	58.0	0.706	–35.5
200	0.478	–115.9	17.148	112.3	0.035	53.4	0.478	–43.5
400	0.422	–150.2	9.497	95.7	0.051	57.9	0.337	–44.6
600	0.417	–166.7	6.515	86.3	0.068	61.0	0.296	–45.3
800	0.423	–176.9	4.996	79.2	0.086	62.4	0.280	–47.3
1000	0.429	174.1	4.072	72.4	0.104	61.7	0.270	–52.3
1200	0.435	167.7	3.456	66.2	0.121	61.1	0.263	–56.5
1400	0.449	162.2	3.001	60.7	0.139	59.7	0.254	–63.1
1600	0.455	157.5	2.672	55.6	0.155	58.6	0.251	–68.2
1800	0.465	153.4	2.388	51.4	0.170	57.4	0.246	–74.9
2000	0.477	148.2	2.208	46.8	0.188	56.0	0.248	–81.2