Ordering number:EN4857

NPN Epitaxial Planar Silicon Transistor

2SC4871

UHF to S Band Low-Noise Amplifier, OSC Applications

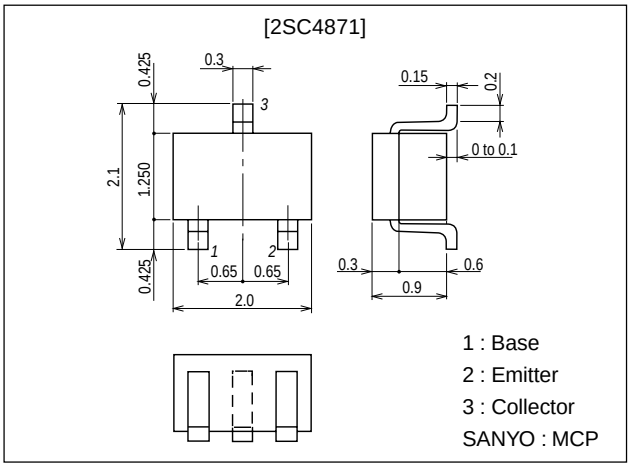
Features

- High cutoff frequency : f_T=10GHz typ.
- High gain : $|S21e|^2$=13dB typ (f=1GHz).
- Low noise : NF=1.3dB typ (f=1GHz).
- Small Cob : Cob=0.4pF typ.

Package Dimensions

unit:mm

2059B



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		20	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=4mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=4mA		10		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.4	0.7	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=7mA, f=1GHz	10	13		dB
Noise Figure	NF	V_{CE}=5V, I_C=4mA, f=1GHz		1.3	2.8	dB

* : The 2SC4871 is classified by 4mA h_{FE} as follows :

60	3	120	90	4	180	135	5	270

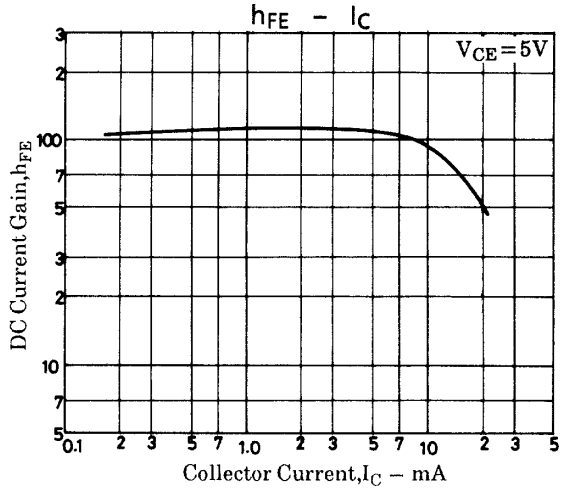
Marking : HN

h_{FE} rank : 3, 4, 5

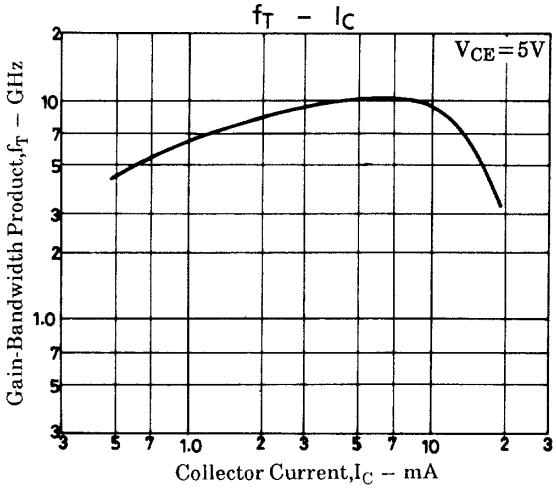
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters

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

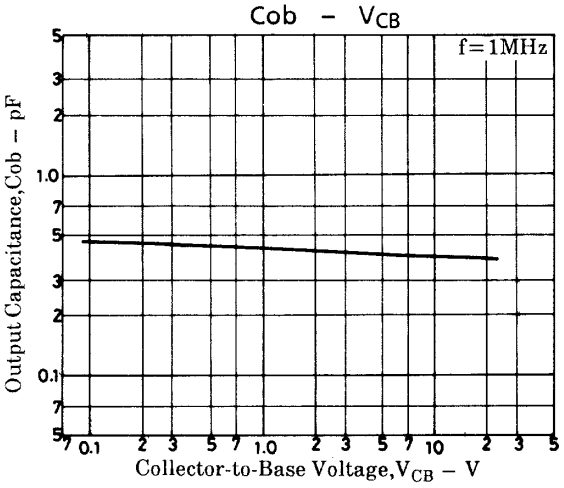
h_{FE} – I_C



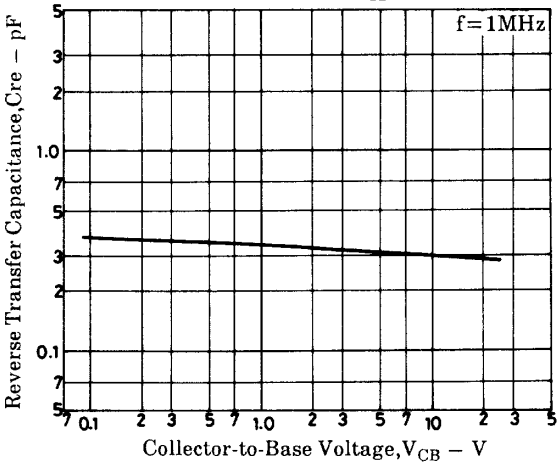
f_T – I_C



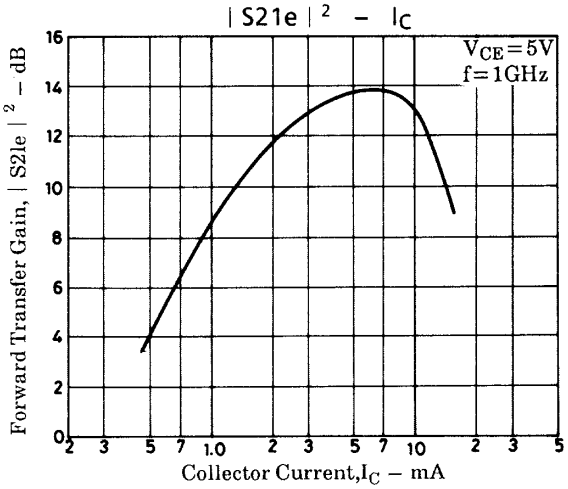
Cob – V_{CB}



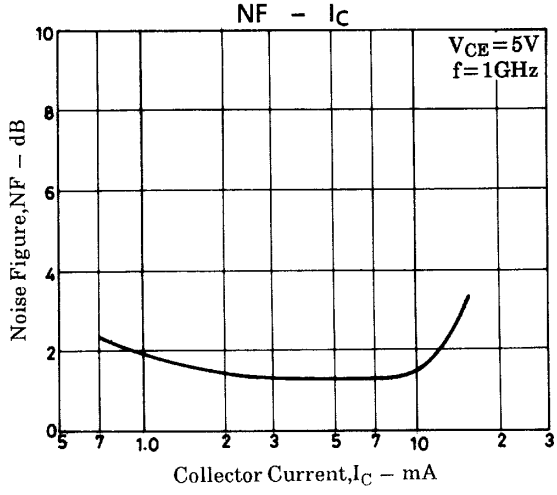
Cre – V_{CB}



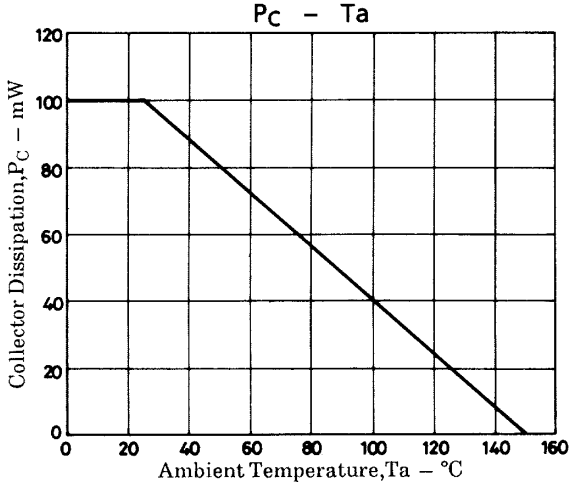
$|S21e|^2$ – I_C



NF – I_C

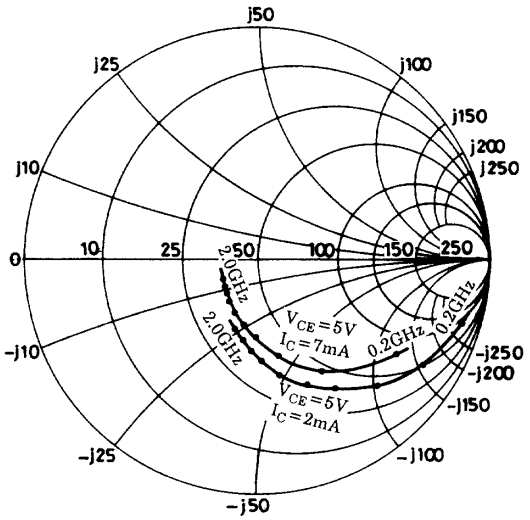


P_C – Ta

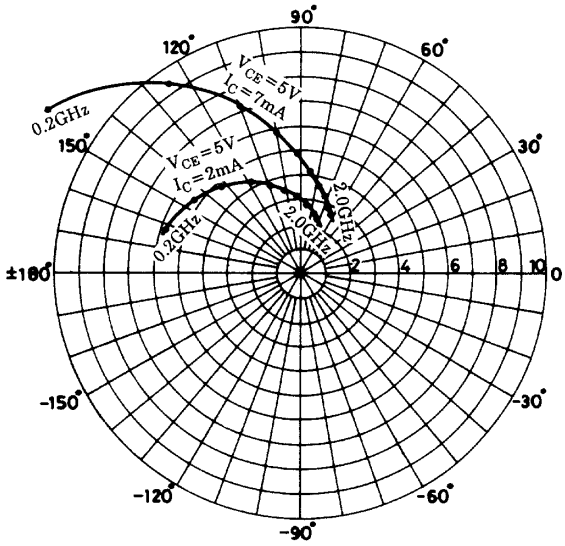


S parameter

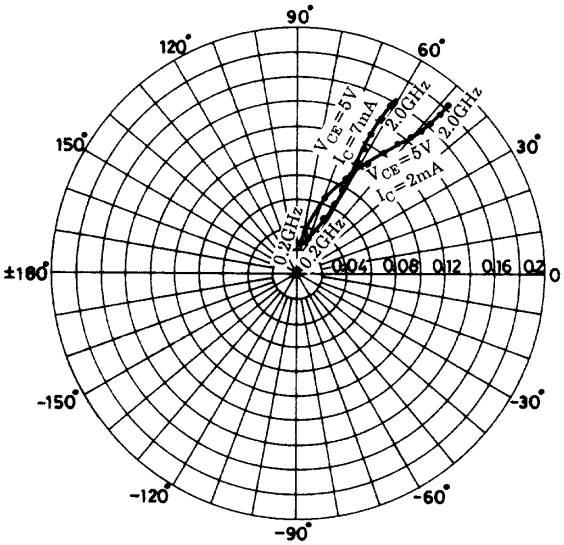
f = 200 to 2000MHz (200MHz Step)



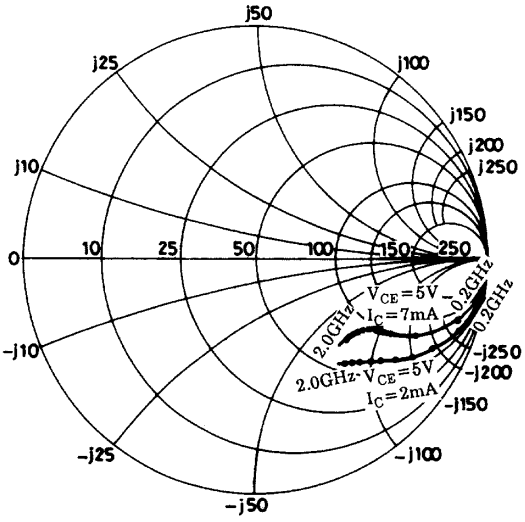
f = 200 to 2000MHz (200MHz Step)



V_{CE} = 5V
f = 200 to 2000MHz (200MHz Step)



f = 200 to 2000MHz (200MHz Step)



S parameter (Common emitter)

V_{CE}=5V, I_C=2mA, 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	0.912	–17.6	5.764	161.5	0.034	79.0	0.974	–10.3
400	0.835	–33.0	5.282	145.5	0.065	69.9	0.919	–19.2
600	0.742	–46.9	4.753	131.2	0.088	62.8	0.850	–26.3
800	0.649	–58.9	4.268	119.4	0.107	57.9	0.789	–31.6
1000	0.578	–68.7	3.840	109.4	0.121	54.5	0.740	–35.5
1200	0.512	–78.1	3.440	100.5	0.134	52.2	0.698	–38.9
1400	0.445	–86.3	3.123	92.5	0.145	50.3	0.664	–41.6
1600	0.400	–93.0	2.836	85.2	0.154	49.2	0.638	–44.3
1800	0.359	–98.5	2.588	79.0	0.164	48.4	0.615	–46.3
2000	0.319	–106.6	2.397	73.0	0.174	47.9	0.601	–48.3

V_{CE}=5V, I_C=7mA, 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	0.721	–35.1	12.262	147.1	0.030	72.8	0.900	–16.9
400	0.555	–59.9	9.445	124.9	0.050	64.4	0.763	–25.6
600	0.428	–77.5	7.290	110.2	0.065	61.9	0.666	–29.3
800	0.344	–89.9	5.877	100.1	0.078	61.5	0.611	–31.1
1000	0.291	–100.6	4.911	92.1	0.091	61.7	0.583	–32.5
1200	0.254	–110.9	4.223	85.1	0.104	61.5	0.563	–34.1
1400	0.221	–121.4	3.703	79.0	0.117	61.6	0.551	–35.7
1600	0.197	–128.9	3.294	73.6	0.129	61.6	0.540	–37.8
1800	0.178	–136.7	3.946	68.5	0.143	61.1	0.530	–39.7
2000	0.171	–148.6	2.692	63.8	0.157	60.7	0.529	–41.7