

**2SC4871**

## UHF to S Band Low-Noise Amplifier, OSC Applications

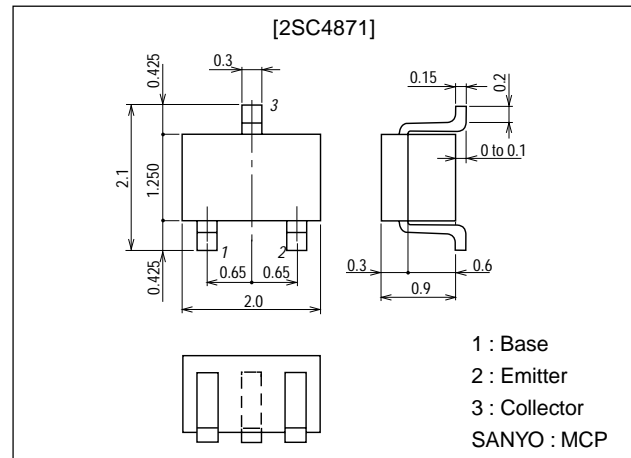
### Features

- High cutoff frequency :  $f_T=10\text{GHz}$  typ.
- High gain :  $|S_{21e}|^2=13\text{dB}$  typ ( $f=1\text{GHz}$ ).
- Low noise :  $NF=1.3\text{dB}$  typ ( $f=1\text{GHz}$ ).
- Small Cob :  $C_{ob}=0.4\text{pF}$  typ.

### Package Dimensions

unit:mm

2059B



### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

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	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

#### Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=10\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=1\text{V}, I_C=0$			10	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=5\text{V}, I_C=4\text{mA}$	60*		270*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=5\text{V}, I_C=4\text{mA}$		10		GHz
Output Capacitance	Cob	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.4	0.7	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=7\text{mA}, f=1\text{GHz}$	10	13		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=4\text{mA}, f=1\text{GHz}$		1.3	2.8	dB

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

60	3	120	90	4	180	135	5	270
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Marking : HN

 $h_{FE}$  rank : 3, 4, 5

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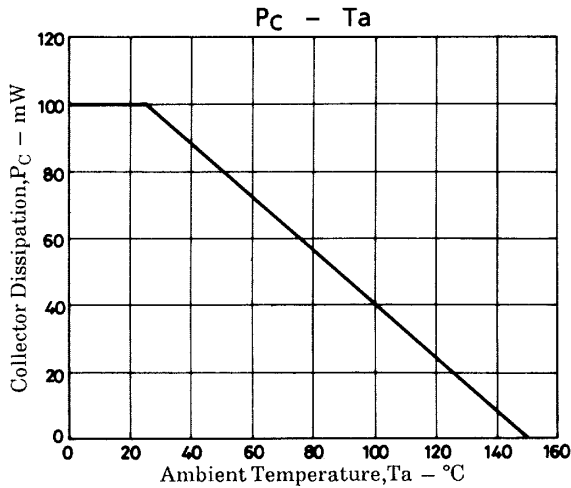
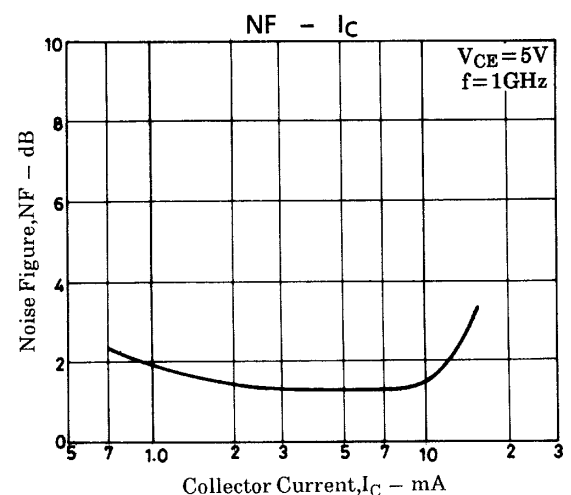
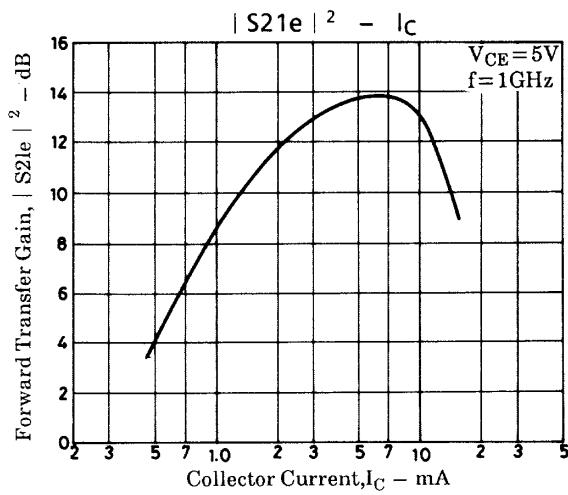
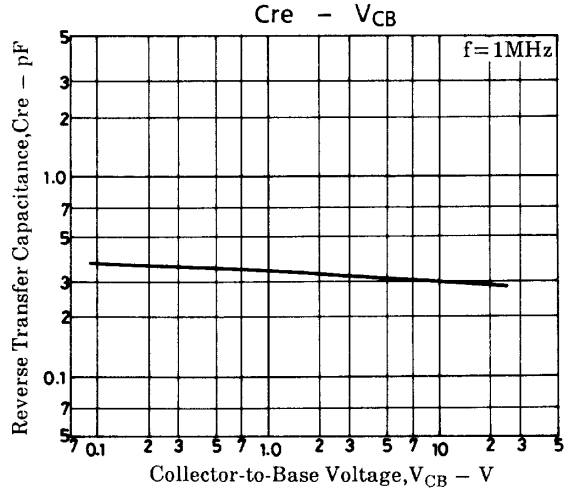
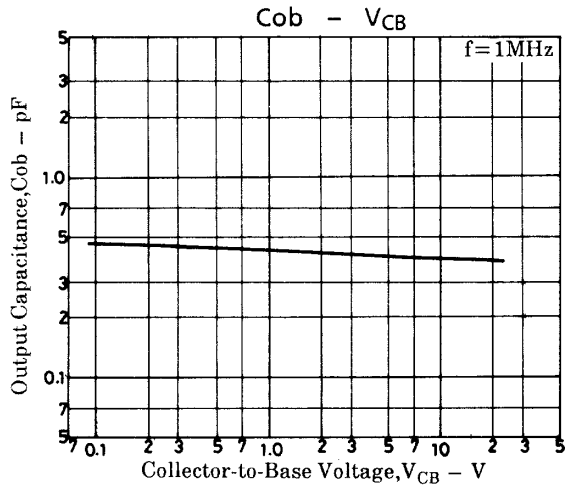
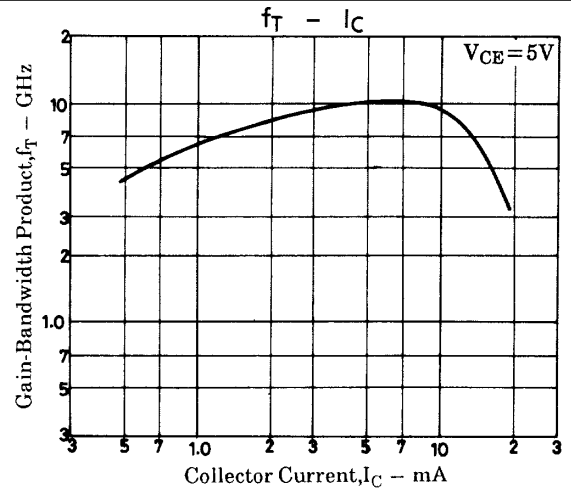
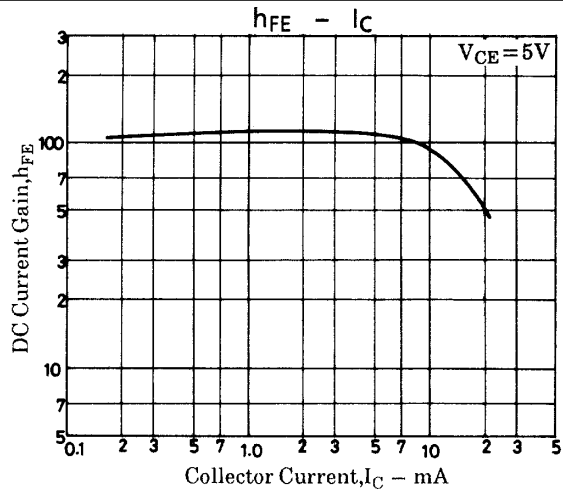
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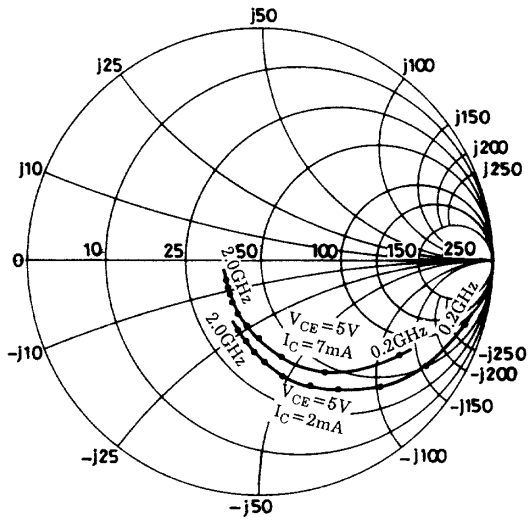
# 2SC4871



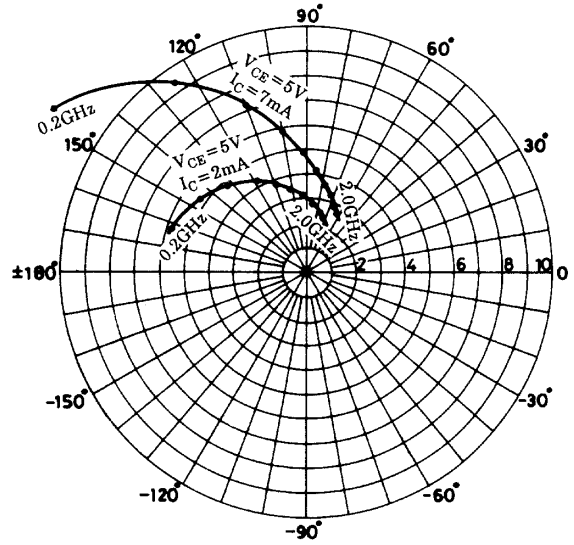
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## S parameter

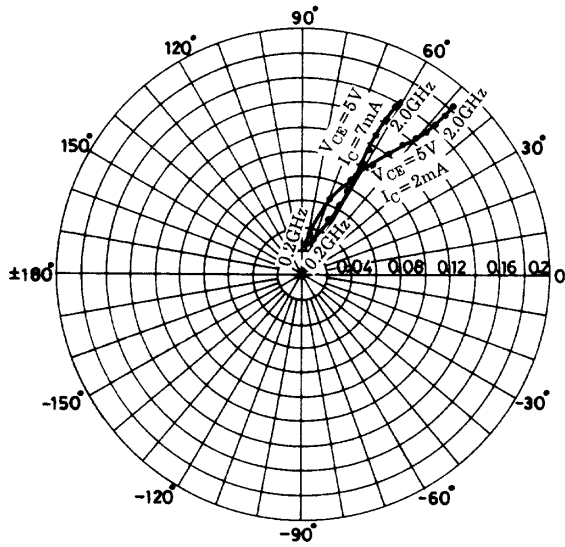
f = 200 to 2000MHz (200MHz Step)



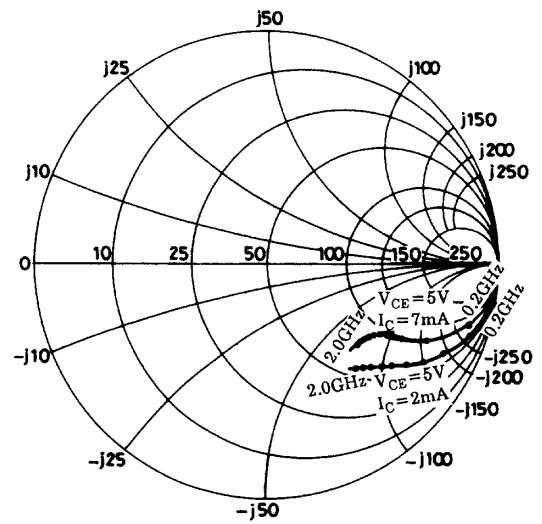
f = 200 to 2000MHz (200MHz Step)



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



f = 200 to 2000MHz (200MHz Step)



## S parameter (Common emitter)

$V_{CE}=5V, I_C=2mA, Z_O=50\Omega$

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

$V_{CE}=5V, I_C=7mA, Z_O=50\Omega$

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

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