

NPN Epitaxial Planar Silicon Transistor

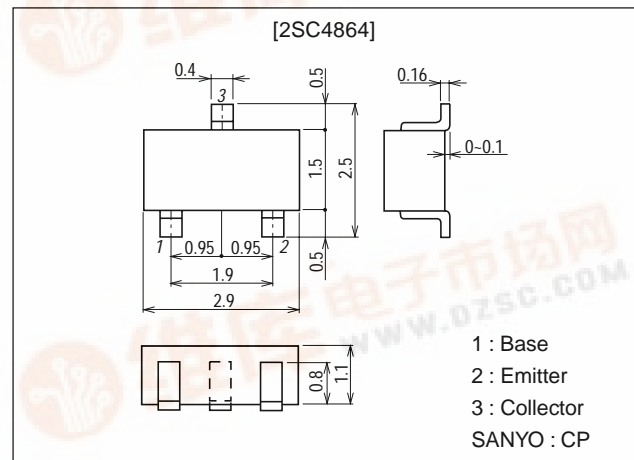
**SANYO****2SC4864****VHF to UHF Wide-Band  
Low-Noise Amplifier Applications****Features**

- Low noise :  $NF=1.1\text{dB}$  typ ( $f=1\text{GHz}$ ).
- High gain :  $|S_{21e}|^2=11\text{dB}$  typ ( $f=1\text{GHz}$ ).
- High cutoff frequency :  $f_T=7.0\text{GHz}$  typ.

**Package Dimensions**

unit:mm

2018B

**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	$V_{EBO}$		2	V
Collector Current	$I_C$		70	mA
Collector Dissipation	$P_C$		200	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	$h_{FE}$	$V_{CE}=5\text{V}$ , $I_C=20\text{mA}$	60*		270*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=5\text{V}$ , $I_C=20\text{mA}$		7.0		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}$ , $f=1\text{MHz}$		0.95	1.4	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}$ , $I_C=20\text{mA}$ , $f=1\text{GHz}$	7	11		dB
Noise Figure	NF	$V_{CE}=5\text{V}$ , $I_C=7\text{mA}$ , $f=1\text{GHz}$		1.1	2.0	dB

\* : The 2SC4864 is classified by 20mA  $h_{FE}$  as follows :

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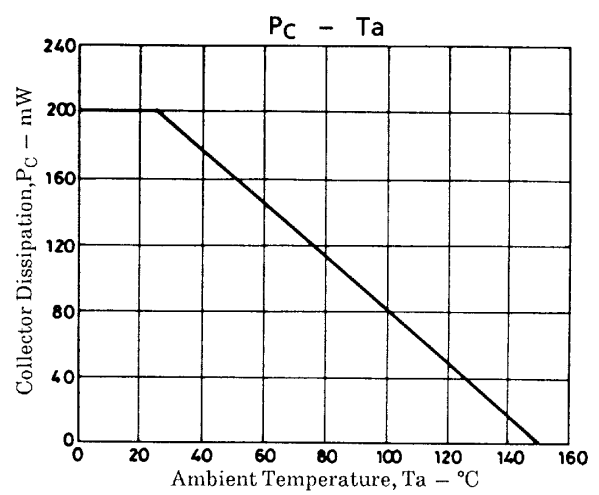
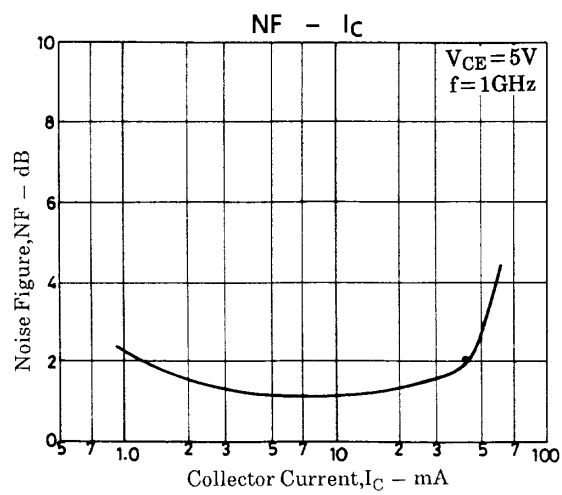
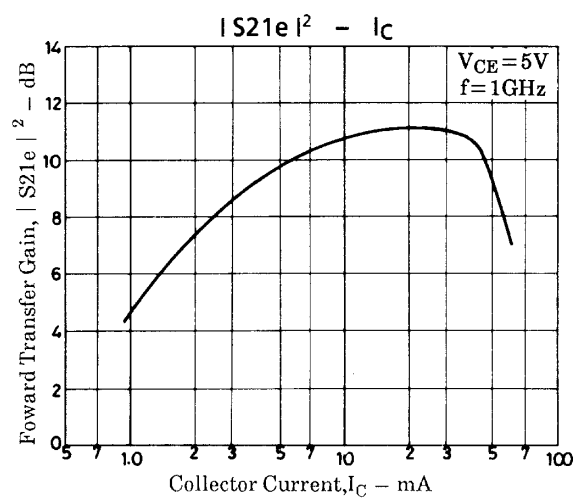
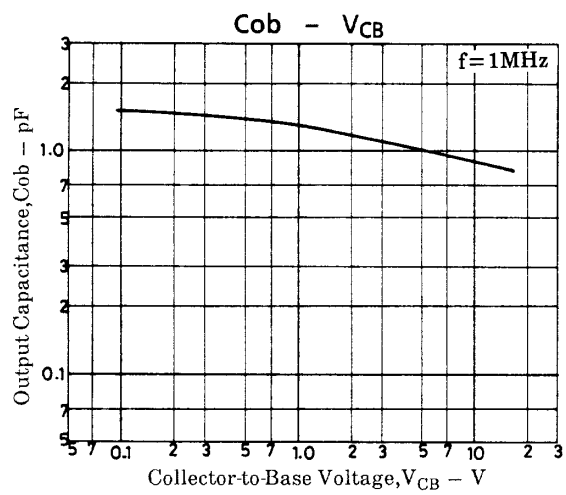
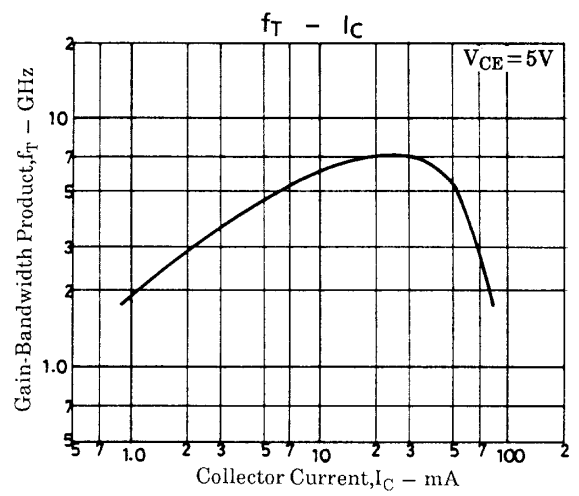
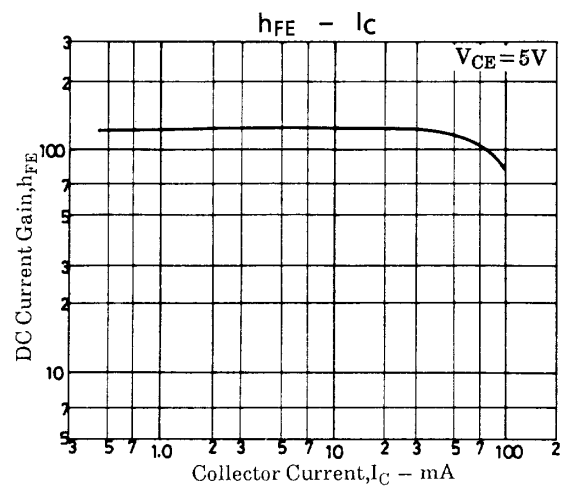
Marking : FN

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

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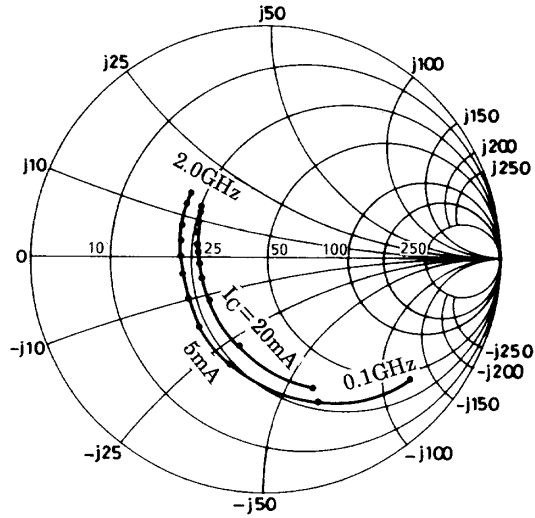
2SC4864



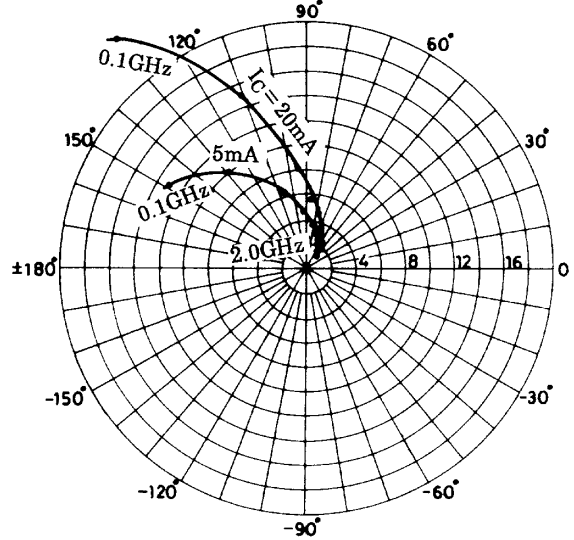
## 2SC4864

### S parameter

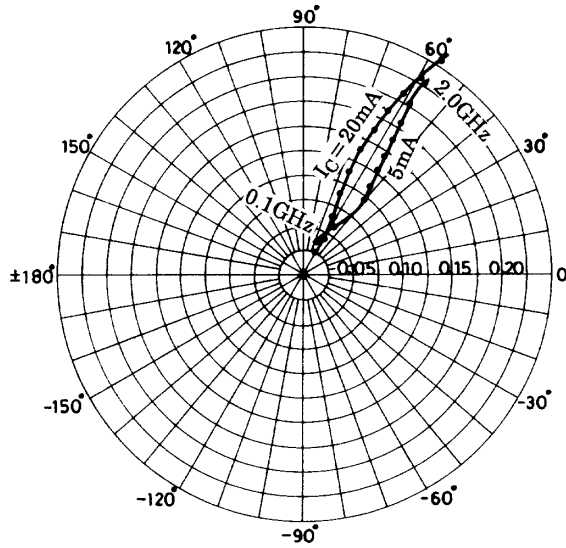
S11e :  $V_{CE} = 5V$   
 $f = 100MHz, 200 \text{ to } 2000MHz (200MHz \text{ step})$



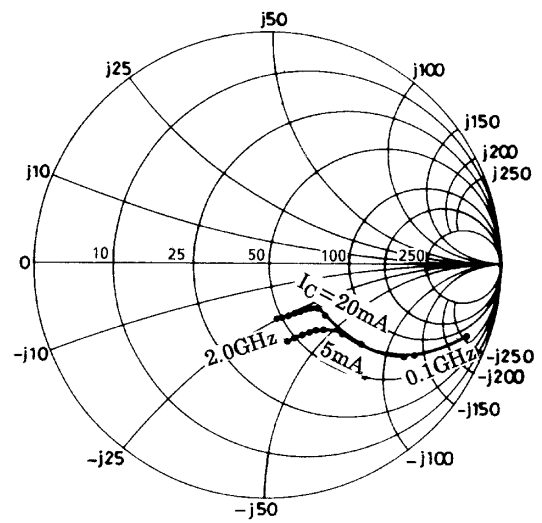
S21e :  $V_{CE} = 5V$   
 $f = 100MHz, 200 \text{ to } 2000MHz (200MHz \text{ step})$



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



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



## 2SC4864

### S parameter (Common emitter)

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

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.778	-40.2	13.012	149.1	0.036	68.7	0.893	-20.9
200	0.632	-70.8	10.144	128.7	0.058	57.4	0.729	-32.7
400	0.467	-110.34	6.532	106.1	0.080	50.1	0.523	-41.6
600	0.411	-136.7	4.723	93.2	0.096	50.7	0.436	-44.3
800	0.383	-154.6	3.712	83.1	0.111	52.8	0.388	-46.9
1000	0.379	-168.9	3.065	74.9	0.128	54.5	0.368	-50.3
1200	0.381	-179.0	2.624	67.4	0.146	55.7	0.354	-54.6
1400	0.383	168.7	2.302	61.2	0.163	56.6	0.346	-59.2
1600	0.395	160.2	2.051	54.7	0.182	57.3	0.342	-64.4
1800	0.412	154.1	1.858	50.0	0.202	57.6	0.339	-70.2
2000	0.423	147.1	1.729	44.9	0.227	57.4	0.337	-75.2

$V_{CE}=5V$ ,  $I_C=20mA$ ,  $Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.517	-70.9	24.026	130.6	0.027	63.8	0.702	-34.9
200	0.384	-108.5	15.011	110.9	0.041	60.5	0.478	-43.3
400	0.310	-144.9	8.261	94.4	0.064	64.0	0.329	-43.8
600	0.301	-164.7	5.701	85.1	0.087	66.0	0.285	-43.8
800	0.299	-176.9	4.392	77.6	0.112	66.5	0.263	-46.5
1000	0.307	173.7	3.586	71.1	0.137	65.6	0.255	-51.5
1200	0.318	165.5	3.035	65.2	0.162	64.2	0.248	-56.9
1400	0.329	158.0	2.650	59.6	0.185	62.7	0.244	-63.1
1600	0.339	151.5	2.345	54.1	0.207	61.1	0.243	-69.8
1800	0.361	147.3	2.126	50.3	0.230	59.6	0.240	-77.1
2000	0.369	142.4	1.977	45.6	0.256	57.7	0.238	-82.6

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