

## NPN High Frequency Low Noise Transistor

### Description

2SC4901 is an ultrahigh frequency low noise transistor; with the plane NPN silicon epitaxy bipolar technology, it has characteristics such as high power gains, low noises and large dynamic ranges. With the SOT-323 package, it is applicable to high-density surface paster installation, mainly used for high frequency low noise wide-band amplifiers such as VHF, UHF and CATV.

### Main Characteristics

High gains:  $|S_{21e}|^2$  typical value of 13.5dB @  $V_{CE}=5V, I_C=20mA, f=0.9GHz$   
 Low noise: NF typical value of 1.6dB @  $V_{CE}=5V, I_C=5mA, f=0.9GHz$   
 Gain bandwidth product: fT typical value of 9GHz @  $V_{CE}=5V, I_C=20mA, f=0.9GHz$

### Ranges of extreme working conditions (TA=25°C)

Parameters	Symbols	Extreme values	Unit
Collector base breakdown voltage	$V_{CBO}$	15	V
Collector emitter breakdown voltage	$V_{CEO}$	9	V
Emitter base breakdown voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	50	mA
Power consumption	$P_C$	100	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-65 ~ +150	°C

### HFE grading

Grading	B	C	D
Mark number	YK-		
HFE	90-140	120-180	170-250

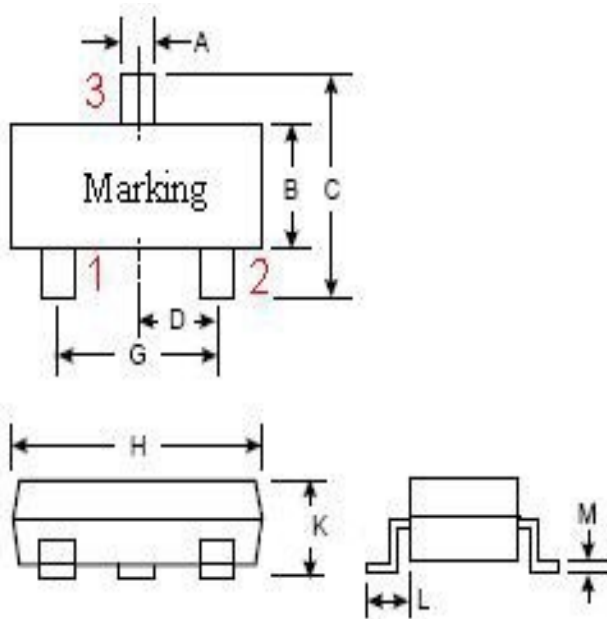
## Electrical properties (TA=25°C)

Parameters	Symbols	Min.	Typical	Max.	Unit	Testing conditions
Collector base breakdown voltage	$V_{CBO}$	15			V	$I_C=1.0\mu A$
Collector base leakage current	$I_{CBO}$			0.1	$\mu A$	$V_{CB}=10V$
Emitter base leakage current	$I_{EBO}$			0.1	$\mu A$	$V_{EB}=1V$
DC gains	$h_{FE}$	90	150	250		$V_{CE}=5V, I_C=20mA$
Gain bandwidth product	fT	7	9		GHz	$V_{CE}=5V, I_C=20mA, f=0.9GHz$
Output feedback capacity	$C_{re}$		0.65	1.0	pF	$V_{CB}=10V, I_E=0mA, f=1MHz$
Insertion power gain	$ S_{21e} ^2$		13.3		dB	$V_{CE}=5V, I_C=5mA, f=0.9GHz$
			13.5		dB	$V_{CE}=5V, I_C=20mA, f=0.9GHz$
Noise factor	NF		1.6	2.5	dB	$V_{CE}=5V, I_C=5mA, f=0.9GHz$

## Package

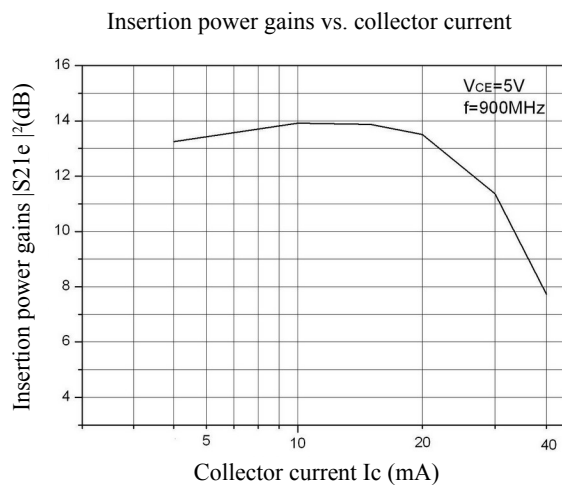
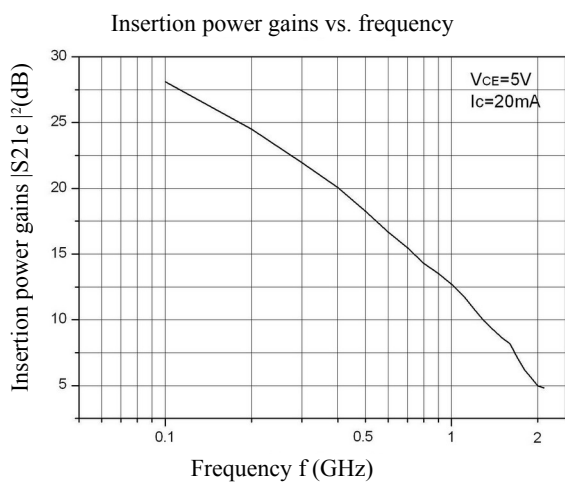
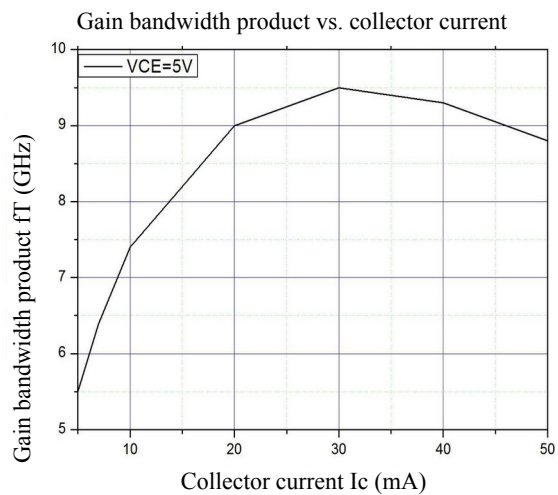
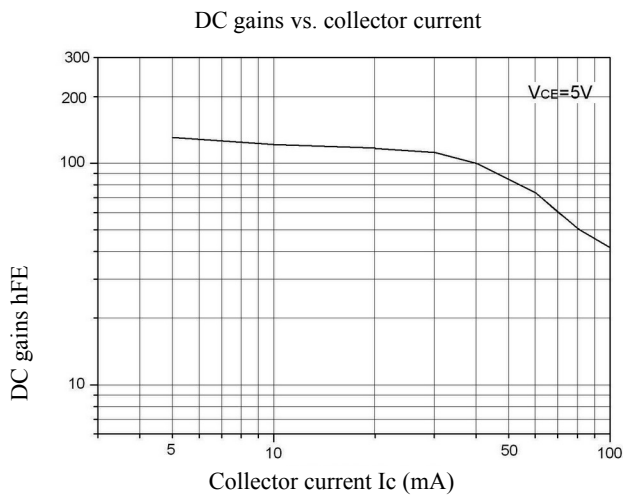
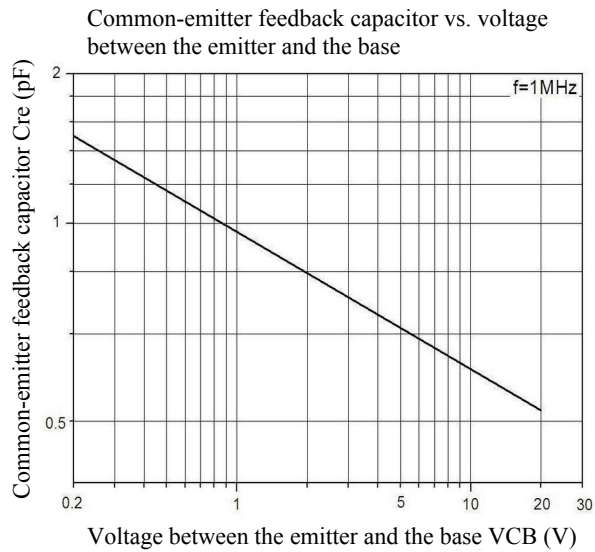
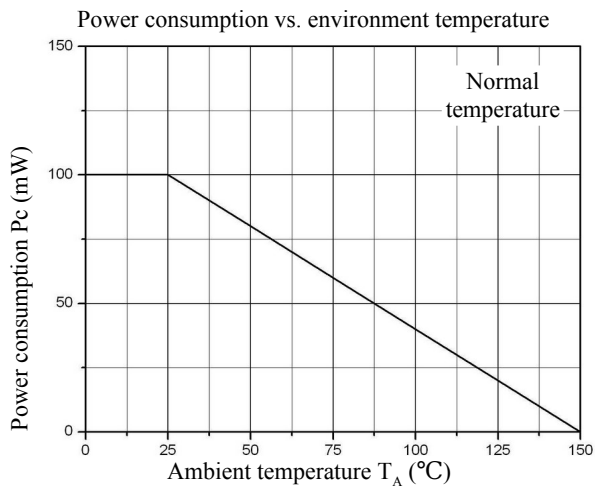
SOT-323

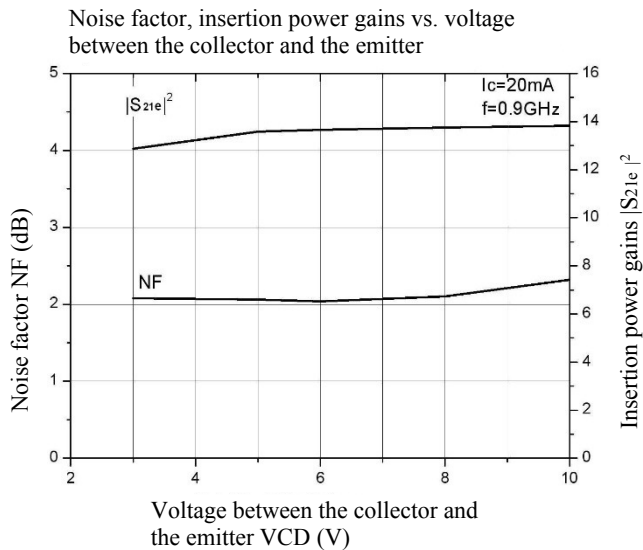
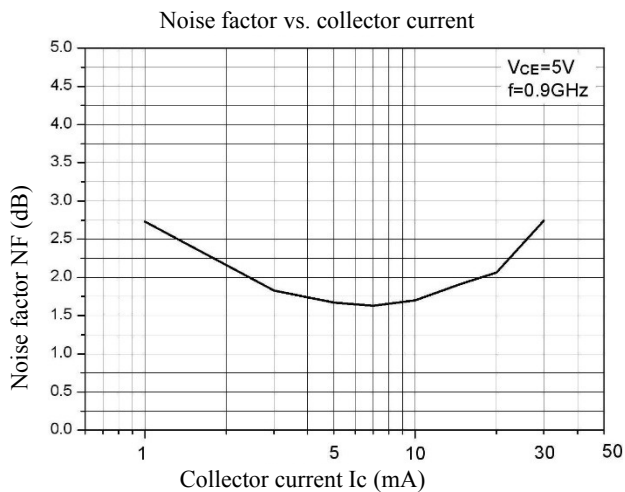
Definition of pin: 1: base; 2: emitter; 3: collector



Symbol	Min. (mm)	Max. (mm)
A	0.200	0.400
B	1.150	1.350
C	2.150	2.450
D	0.650	
G	1.200	1.400
H	2.000	2.200
K	0.900	1.100
L	0.525	
M	0.080	0.150

## Typical characteristic curve (TA =25°C)



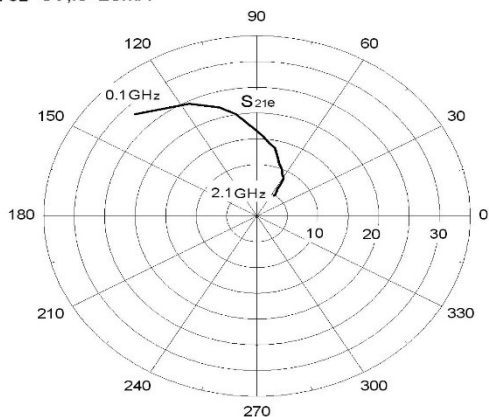


## SMITH drawing

Testing conditions:  $V_{CE}=5V, I_C=20mA$

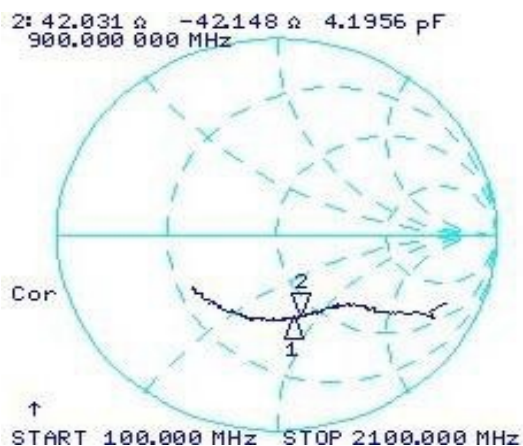
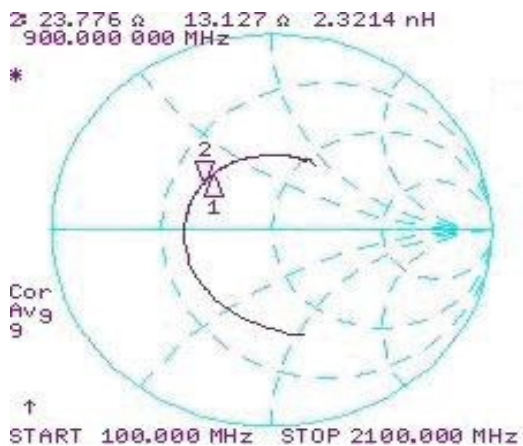
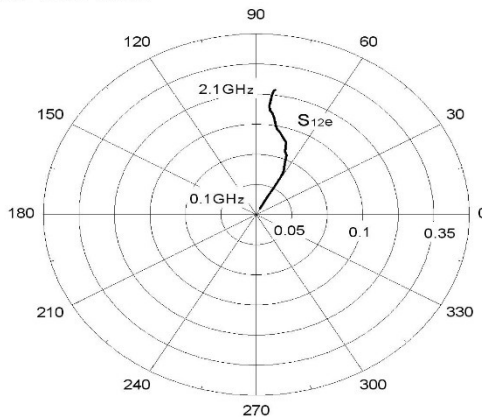
### $S_{21e}$ -FREQUENCY

Conditions:  $V_{CE}=5V, I_C=20mA$



### $S_{12e}$ -FREQUENCY

Conditions:  $V_{CE}=5V, I_C=20mA$



**Scattering parameters S-PARAMETER)**

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

Testing frequency	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.1	0.482	-79.853	25.430	135.31	0.020	63.866	0.786	-21.025
0.2	0.450	-120.84	16.776	117.16	0.026	64.66	0.614	-40.075
0.3	0.419	-146.54	12.511	106.35	0.033	67.181	0.513	-45.357
0.4	0.410	-163.95	10.054	99.859	0.040	64.4	0.467	-48.73
0.5	0.402	-178.26	8.186	95.673	0.046	66.285	0.452	-54.326
0.6	0.400	170.03	6.831	90.637	0.051	68.126	0.440	-59.156
0.7	0.395	159.69	5.944	86.449	0.061	68.343	0.434	-64.801
0.8	0.399	150.44	5.183	82.109	0.064	71.459	0.427	-70.457
0.9	0.397	142.48	4.741	77.456	0.077	73.043	0.433	-76.914
1	0.394	134.17	4.330	75.451	0.081	74.011	0.431	-81.942
1.1	0.394	126.01	3.904	73.331	0.090	78.88	0.434	-87.979
1.2	0.393	118.88	3.460	70.505	0.093	82.093	0.433	-92.392
1.3	0.395	111.24	3.131	65.779	0.100	79.846	0.439	-99.814
1.4	0.388	104.27	2.895	63.501	0.115	80.355	0.438	-105.56
1.5	0.385	98.31	2.701	59.745	0.126	84.651	0.444	-111.63
1.6	0.387	90.492	2.567	58.722	0.131	85.665	0.442	-117.48
1.7	0.389	84.07	2.263	60.445	0.144	86.137	0.443	-123.71
1.8	0.393	77.013	2.041	57.306	0.156	83.966	0.456	-129.5
1.9	0.392	71.616	1.902	55.569	0.176	83.702	0.455	-134.9
2	0.396	65.487	1.777	53.999	0.192	85.078	0.466	-140.24
2.1	0.391	57.703	1.746	54.863	0.196	83.86	0.459	-145.73