
2SC4901

Silicon NPN Epitaxial

HITACHI

Application

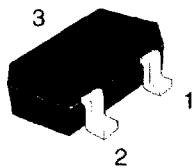
UHF / VHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 9 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 13.0 \text{ dB Typ}$, $NF = 1.2 \text{ dB Typ}$ at $f = 900 \text{ MHz}$

Outline

CMPAK



- 1. Emitter
- 2. Base
- 3. Collector

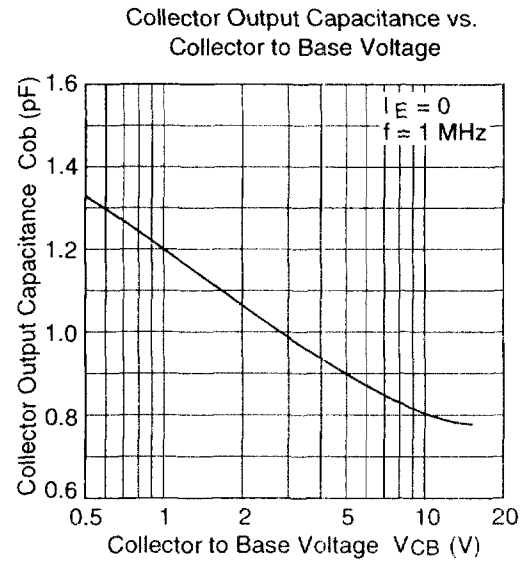
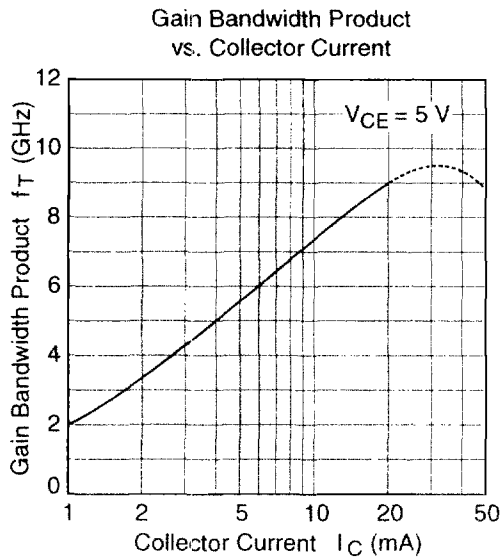
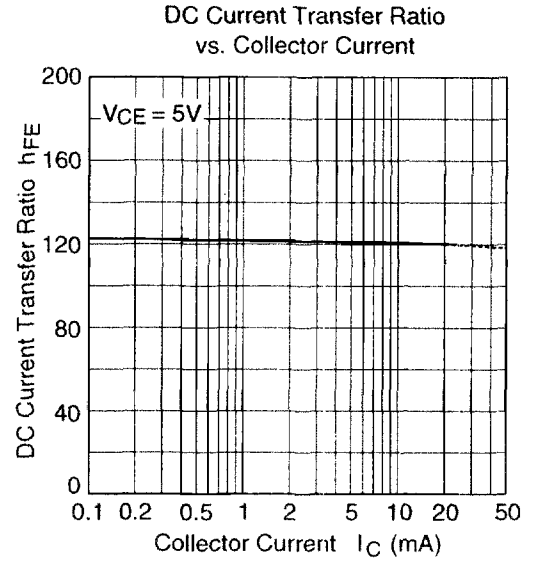
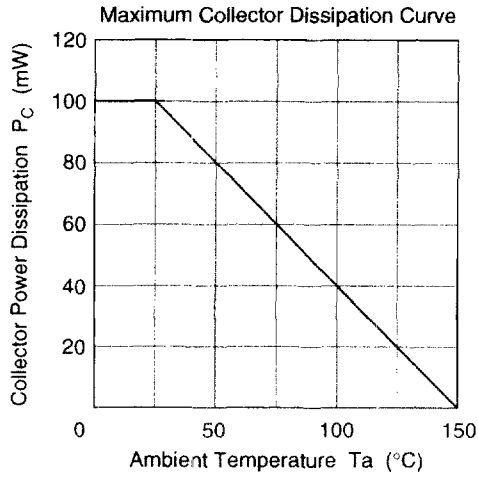
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	9	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_{C}	50	mA
Collector power dissipation	P_{C}	100	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

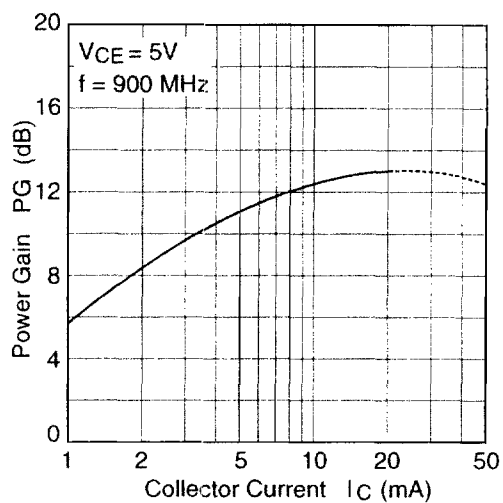
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{\text{(BR)CBO}}$	15	—	—	V	$I_{\text{C}} = 10\text{ }\mu\text{A}$, $I_{\text{E}} = 0$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{\text{CB}} = 12\text{ V}$, $I_{\text{E}} = 0$
	I_{CEO}	—	—	1	mA	$V_{\text{CE}} = 9\text{ V}$, $R_{\text{BE}} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{\text{EB}} = 1.5\text{ V}$, $I_{\text{C}} = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{\text{CE}} = 5\text{ V}$, $I_{\text{C}} = 20\text{ mA}$
Collector output capacitance	C_{ob}	—	0.9	1.4	pF	$V_{\text{CB}} = 5\text{ V}$, $I_{\text{E}} = 0$, $f = 1\text{ MHz}$
Gain bandwidth product	f_{T}	6.0	9.0	—	GHz	$V_{\text{CE}} = 5\text{ V}$, $I_{\text{C}} = 20\text{ mA}$
Power gain	PG	10.0	13.0	—	dB	$V_{\text{CE}} = 5\text{ V}$, $I_{\text{C}} = 20\text{ mA}$, $f = 900\text{ MHz}$
Noise figure	NF	—	1.2	2.5	dB	$V_{\text{CE}} = 5\text{ V}$, $I_{\text{C}} = 5\text{ mA}$, $f = 900\text{ MHz}$

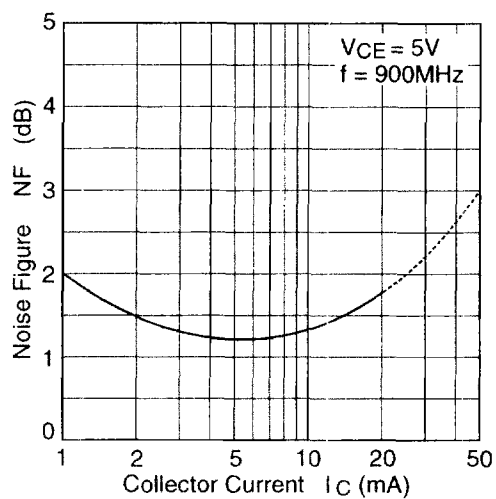
Note: Marking is "YK-".



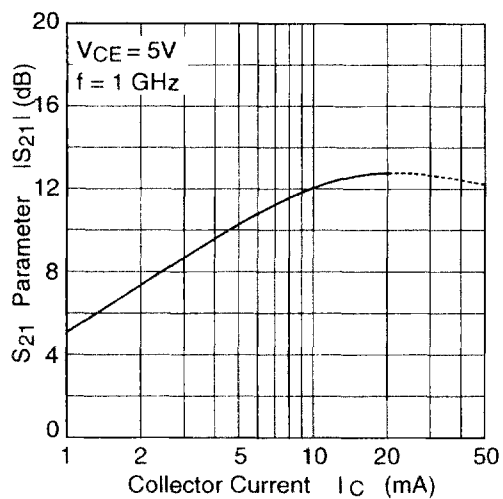
Power Gain vs. Collector Current



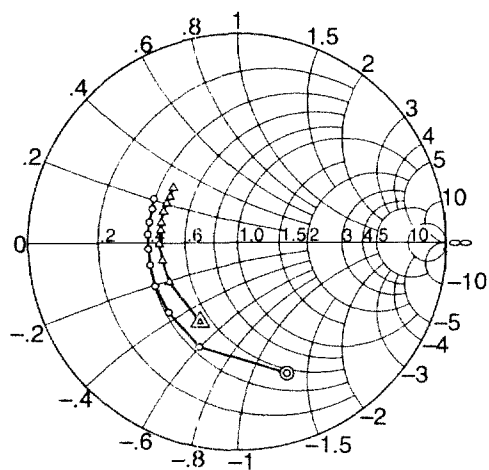
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current



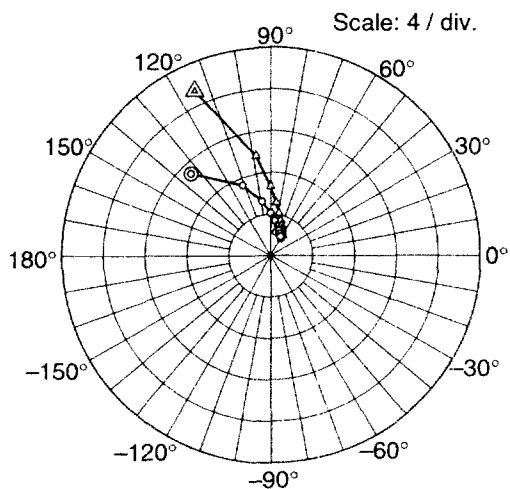
S11 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

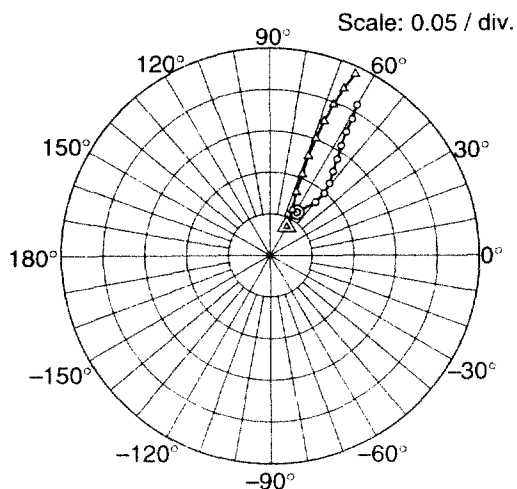
S21 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

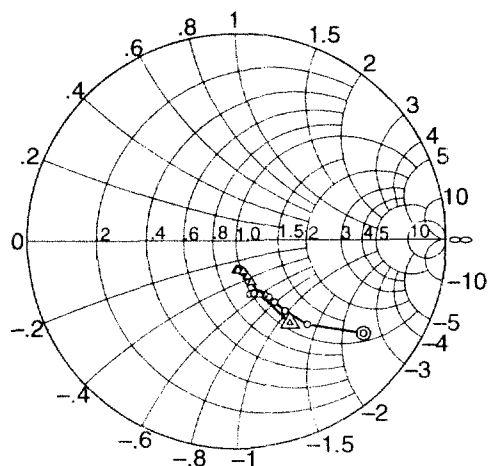
S12 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

S22 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
200 to 2000 MHz (200 MHz step)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 20\text{ mA}$)

S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $Z_0 = 50\ \Omega$, Emitter common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.672	-69.4	10.99	134.0	0.0610	58.8	0.752	-26.7
400	0.533	-109.9	7.32	111.5	0.0841	49.9	0.528	-50.5
600	0.469	-134.7	5.28	98.8	0.0989	49.3	0.412	-56.0
800	0.446	-152.3	4.12	90.2	0.112	50.9	0.351	-59.0
1000	0.432	-165.9	3.37	83.2	0.126	53.5	0.316	-61.0
1200	0.427	-176.2	2.88	77.2	0.141	55.5	0.294	-63.3
1400	0.430	174.1	2.52	72.1	0.157	57.4	0.282	-66.0
1600	0.433	166.5	2.26	67.5	0.174	58.6	0.274	-69.1
1800	0.439	158.0	2.04	63.3	0.191	59.2	0.269	-72.0
2000	0.453	151.9	1.88	59.2	0.209	60.0	0.265	-76.0

S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$, $Z_0 = 50\ \Omega$, Emitter common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.421	-115.2	17.40	114.7	0.0399	50.6	0.474	-57.7
400	0.377	-150.2	9.74	98.5	0.0609	64.2	0.284	-67.2
600	0.370	-167.0	6.68	90.1	0.0822	67.8	0.213	-70.5
800	0.373	-179.1	5.09	84.0	0.105	68.6	0.180	-72.9
1000	0.371	170.6	4.13	79.0	0.128	69.2	0.161	-74.9
1200	0.377	164.9	3.49	74.3	0.151	68.9	0.151	-77.6
1400	0.384	156.9	3.04	70.3	0.174	68.3	0.146	-80.7
1600	0.388	150.7	2.71	66.8	0.197	67.3	0.143	-83.5
1800	0.392	145.3	2.45	63.3	0.219	66.2	0.142	-87.2
2000	0.406	139.0	2.25	59.5	0.241	64.9	0.141	-91.0