
2SC4902

Silicon NPN Epitaxial

HITACHI

Application

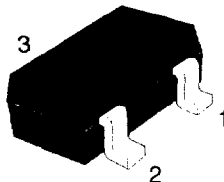
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 6 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 12.0 \text{ dB Typ}$, $NF = 1.6 \text{ dB Typ}$ at $f = 900 \text{ MHz}$

Outline

MPAK



1. Emitter
2. Base
3. Collector

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

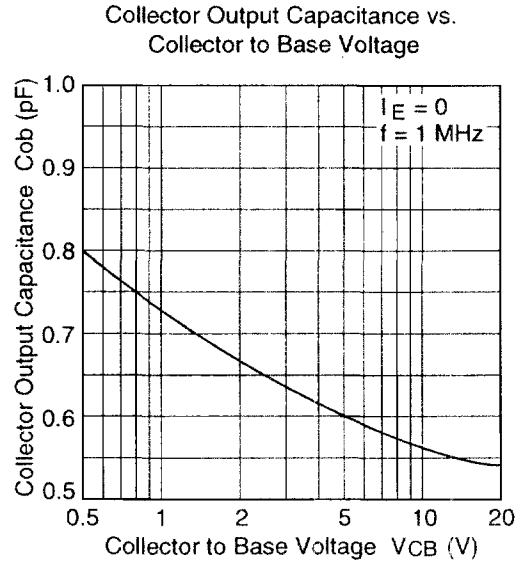
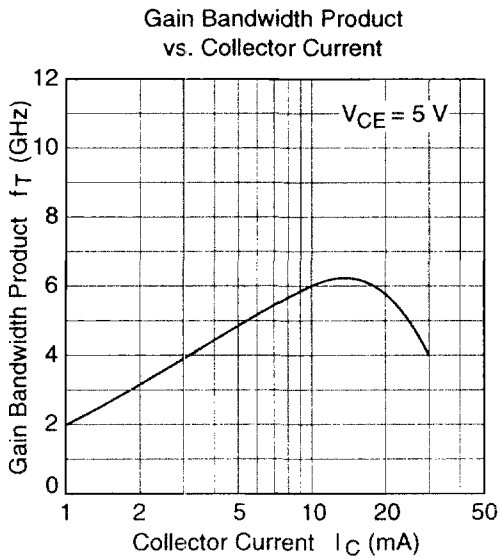
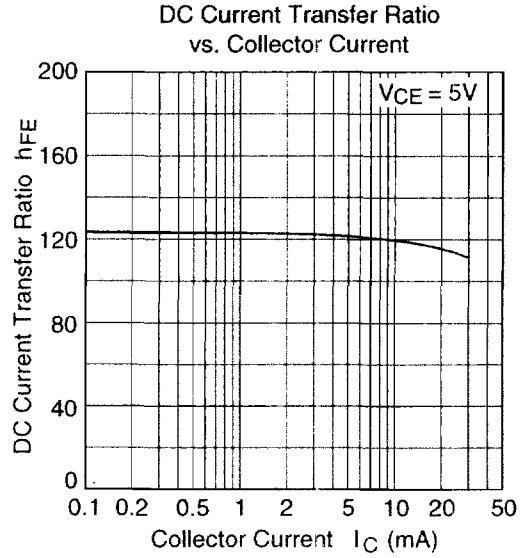
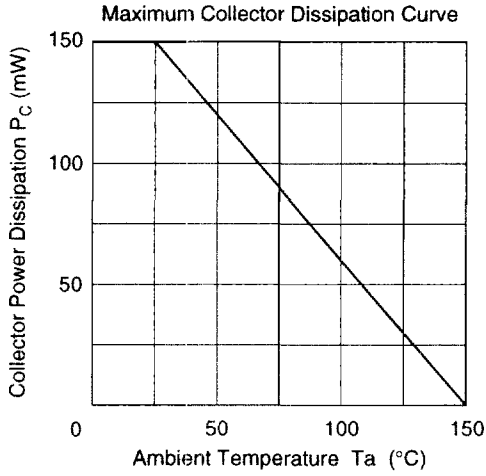
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	12	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	30	mA
Collector power dissipation	P_C	150	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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

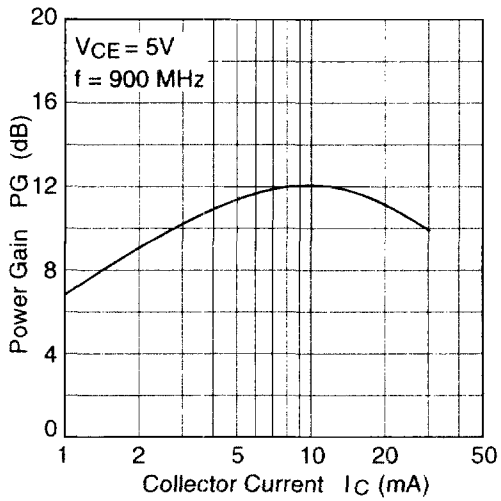
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 20\text{ V}, I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 12\text{ V}, R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 2\text{ V}, I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Collector output capacitance	C_{ob}	—	0.6	1.0	pF	$V_{CB} = 5\text{ V}, I_E = 0,$ $f = 1\text{ MHz}$
Gain bandwidth product	f_T	4.0	6.0	—	GHz	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$
Power gain	PG	9.5	12.0	—	dB	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA},$ $f = 900\text{ MHz}$
Noise figure	NF	—	1.6	3.0	dB	$V_{CE} = 5\text{ V}, I_C = 5\text{ mA},$ $f = 900\text{ MHz}$

Note: Marking is "YL-".

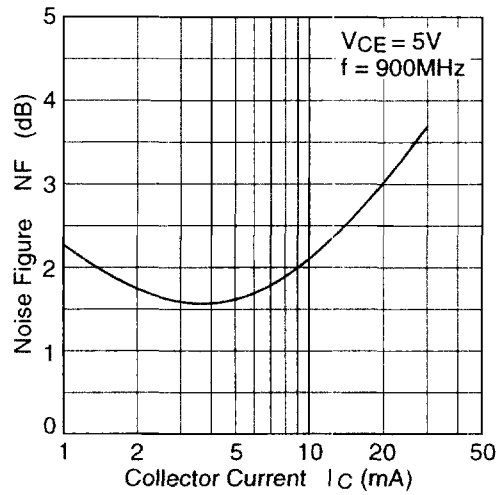
Attention: This is electrostatic sensitive device.



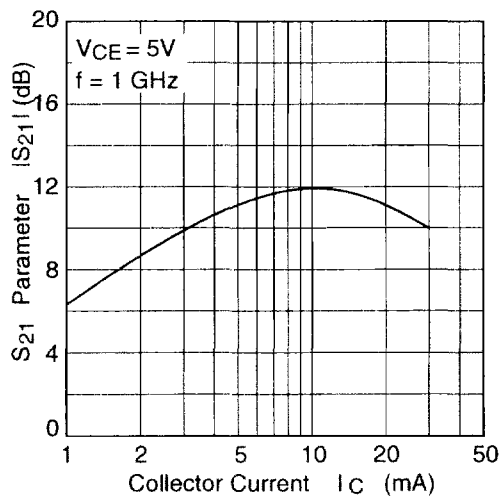
Power Gain vs. Collector Current



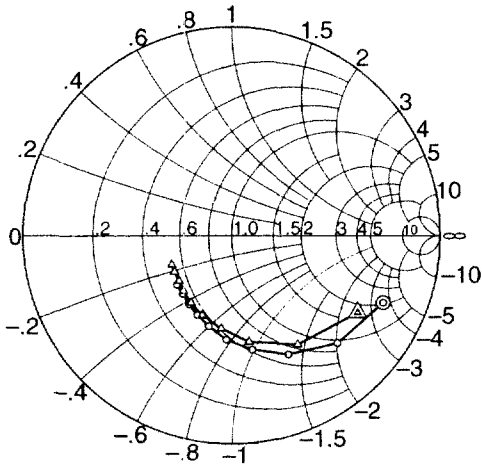
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current

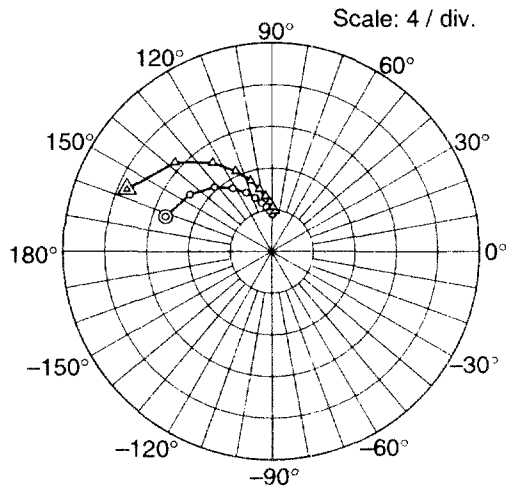


S11 Parameter vs. Frequency



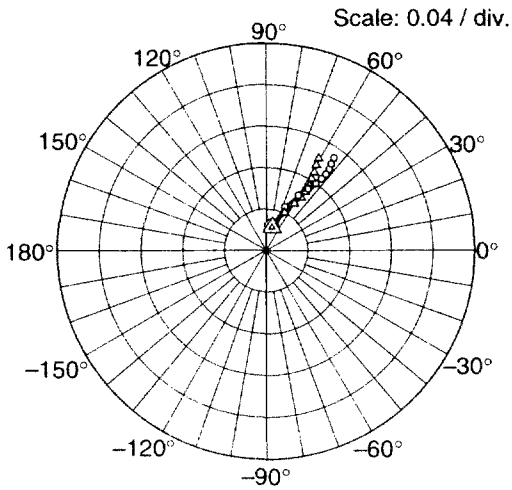
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S21 Parameter vs. Frequency



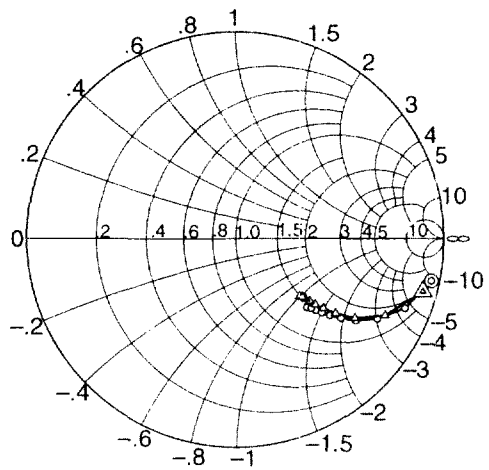
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S12 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

S22 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 100 to 1000 (100 MHz step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 △ — △ ($I_C = 10\text{ mA}$)

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

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.792	-23.8	10.79	161.8	0.0247	77.8	0.961	-12.2
200	0.721	-45.5	9.63	145.3	0.0455	67.4	0.876	-22.4
300	0.629	-64.5	8.31	131.9	0.0613	60.4	0.778	-29.6
400	0.556	-79.9	7.15	122.0	0.0717	56.2	0.695	-34.4
500	0.500	-93.1	6.18	113.9	0.0800	53.9	0.631	-37.3
600	0.448	-104.3	5.39	107.6	0.0869	52.7	0.581	-39.5
700	0.415	-113.7	4.77	102.2	0.0930	52.3	0.543	-40.9
800	0.388	-122.0	4.30	97.6	0.0989	52.5	0.514	-42.1
900	0.366	-130.5	3.89	93.1	0.104	53.4	0.491	-42.9
1000	0.354	-138.4	3.56	89.6	0.110	54.1	0.474	-44.3

S Parameter ($V_{CE} = 5\text{ V}$, $I_C = 10\text{ mA}$, $Z_o = 50\ \Omega$, Emitter common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.706	-31.5	15.14	156.8	0.0230	75.7	0.933	-15.8
200	0.608	-58.8	12.67	137.4	0.0403	64.5	0.803	-27.3
300	0.516	-80.9	10.28	123.8	0.0525	59.2	0.684	-33.8
400	0.449	-96.5	8.48	114.5	0.0609	57.0	0.597	-37.1
500	0.407	-110.4	7.13	107.0	0.0678	56.5	0.536	-38.8
600	0.376	-121.5	6.13	101.5	0.0747	56.5	0.494	-39.9
700	0.352	-131.4	5.36	96.7	0.0815	57.9	0.463	-40.4
800	0.334	-139.5	4.77	92.7	0.0882	58.7	0.441	-41.1
900	0.325	-147.9	4.28	88.9	0.0953	59.9	0.424	-41.5
1000	0.320	-154.4	3.90	85.9	0.102	60.6	0.412	-42.3