2SC4874

Silicon NPN Epitaxial

HITACHI

Application

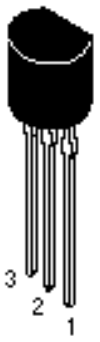
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 5.8 GHz Typ
- High gain, low noise figure
  PG = 10.0 dB Typ, NF = 1.8 dB Typ at f = 900 MHz

Outline

TO-92 (2)



1. Base
2. Emitter
3. Collector

Hitachi semiconductor

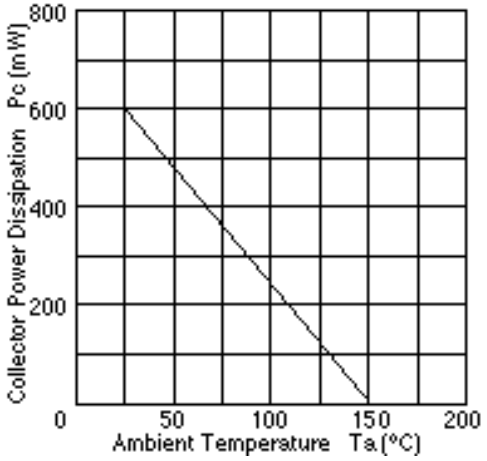
Absolute Maximum Ratings (Ta = 25°C)

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	50	mA
Collector power dissipation	P_C	600	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

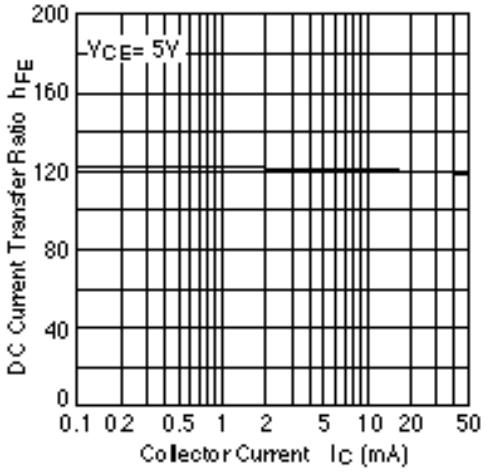
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	20	—	—	V	I_C = 10 µA, I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	µA	V_{CB} = 15 V, I_E = 0
	I_{CEO}	—	—	1	mA	V_{CE} = 12 V, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	V_{EB} = 2 V, I_C = 0
DC current transfer ratio	h_{FE}	50	120	250		V_{CE} = 5 V, I_C = 20 mA
Collector output capacitance	Cob	—	1.3	1.8	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	4.0	5.8	—	GHz	V_{CE} = 5 V, I_C = 20 mA
Power gain	PG	7.5	10.0	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	1.8	3.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

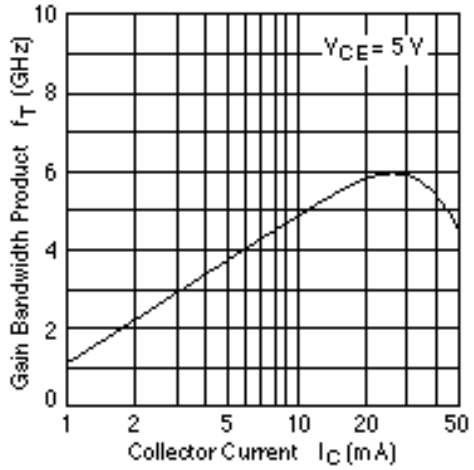
Maximum Collector Dissipation Curve



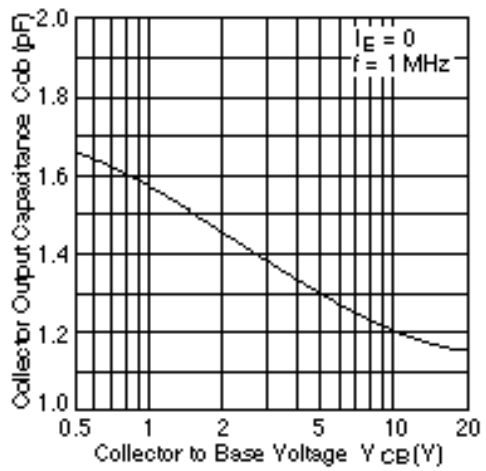
DC Current Transfer Ratio vs. Collector Current



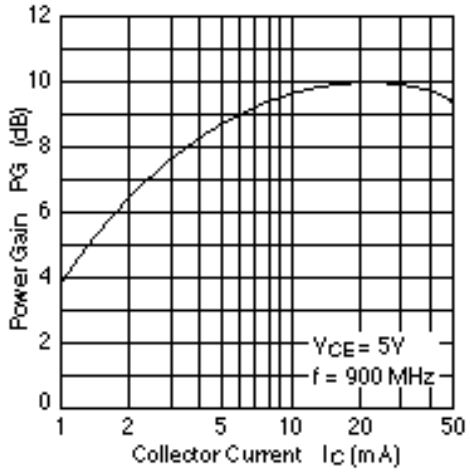
Gain Bandwidth Product vs. Collector Current



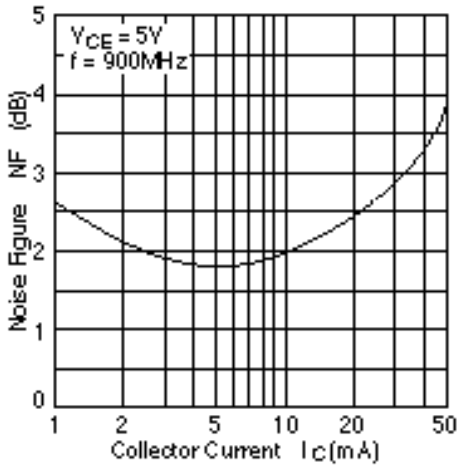
Collector Output Capacitance vs. Collector to Base Voltage



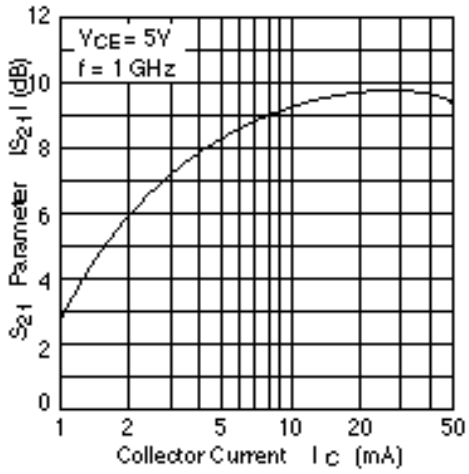
Power Gain vs. Collector Current



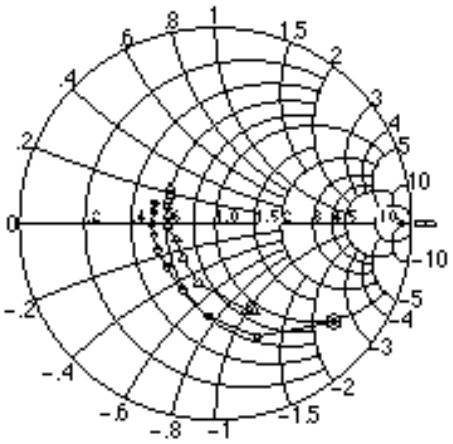
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current

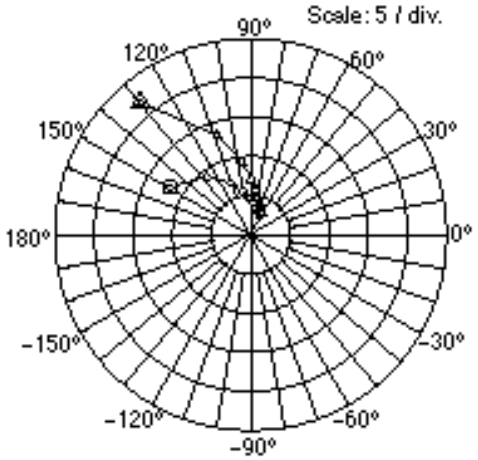


S11 Parameter vs. Frequency



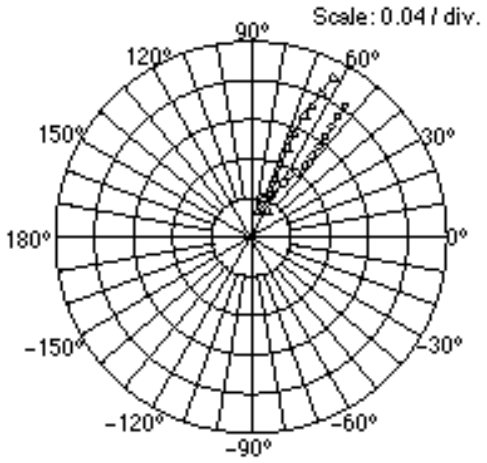
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S21 Parameter vs. Frequency



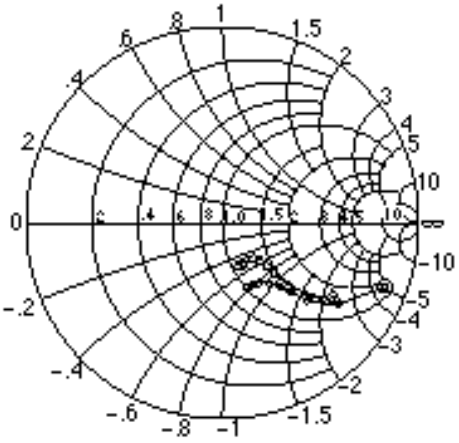
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S Parameter (V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω, Emitter Common)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.784	–39.6	12.03	149.8	0.0396	71.3	0.890	–21.4
200	0.614	–69.7	9.23	127.0	0.0651	59.5	0.718	–35.3
300	0.474	–94.3	7.06	111.6	0.0810	55.0	0.587	–42.3
400	0.378	–116.3	5.66	100.6	0.0926	53.3	0.499	–45.3
500	0.330	–138.0	4.68	91.9	0.104	53.5	0.435	–48.1
600	0.322	–155.5	4.03	85.2	0.116	53.5	0.387	–52.5
700	0.320	–169.9	3.52	78.9	0.127	53.8	0.360	–58.2
800	0.325	–179.7	3.13	73.8	0.140	54.1	0.353	–63.5
900	0.321	168.8	2.81	68.5	0.152	54.4	0.353	–67.3
1000	0.326	161.1	2.58	63.8	0.165	54.6	0.348	–69.9

S Parameter (V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω, Emitter Common)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.477	–68.2	21.97	130.0	0.0297	66.5	0.686	–35.2
200	0.318	–105.4	13.32	108.8	0.0469	65.3	0.468	–44.2
300	0.240	–133.3	9.19	97.1	0.0633	66.9	0.372	–44.8
400	0.215	–157.6	7.05	89.5	0.0797	67.6	0.318	–44.4
500	0.224	–177.3	5.68	83.8	0.0968	67.5	0.276	–45.4
600	0.242	170.0	4.81	78.6	0.113	67.2	0.246	–49.5
700	0.263	161.0	4.15	74.0	0.130	66.2	0.230	–56.8
800	0.270	154.9	3.66	69.7	0.146	65.1	0.231	–63.8
900	0.273	147.6	3.27	65.5	0.163	64.1	0.238	–68.4
1000	0.291	141.7	2.99	61.8	0.180	62.8	0.237	–71.5

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