
2SC4875

Silicon NPN Epitaxial

HITACHI

Application

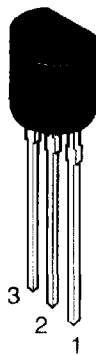
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 8.5 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 11.5 \text{ dB Typ}$, $NF = 1.3 \text{ dB Typ}$ at $f = 900 \text{ MHz}$

Outline

TO-92 (2)



1. Base
2. Emitter
3. Collector

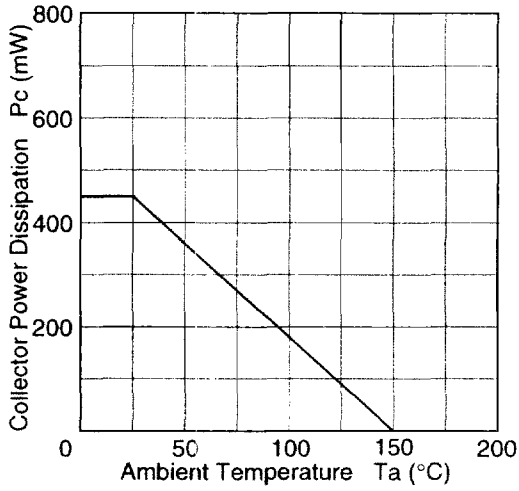
Absolute Maximum Ratings (Ta = 25°C)

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	450	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

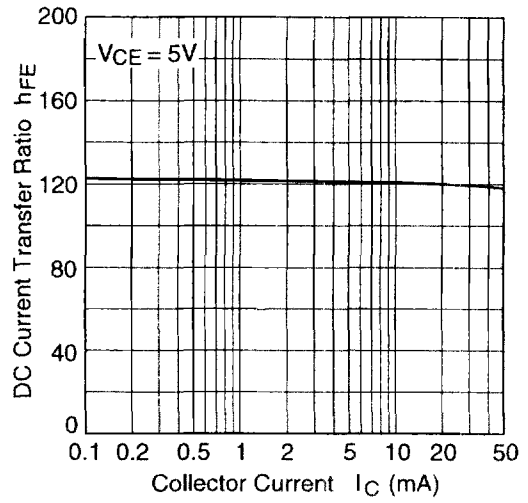
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CB} = 12 V, I_E = 0$
	I_{CEO}	—	—	1	mA	$V_{CE} = 9 V, R_{BE} = \infty$
Emitter cutoff current	I_{EBO}	—	—	10	μA	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	h_{FE}	50	120	250		$V_{CE} = 5 V, I_C = 20 mA$
Output capacitance	C_{ob}	—	1.2	1.7	pF	$V_{CB} = 5 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	f_T	5.5	8.5	—	GHz	$V_{CE} = 5 V, I_C = 20 mA$
Power gain	PG	8.5	11.5	—	dB	$V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz$
Noise figure	NF	—	1.3	2.5	dB	$V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz$

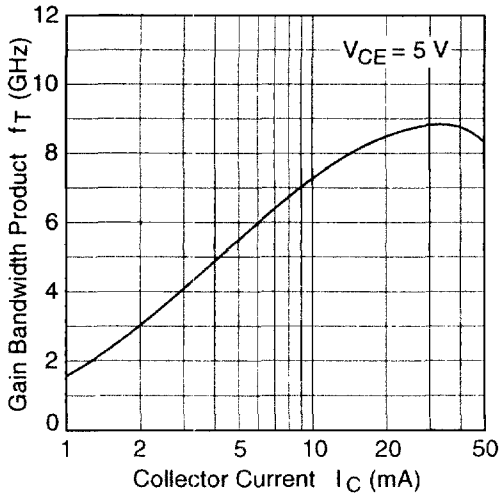
Maximum Collector Dissipation Curve



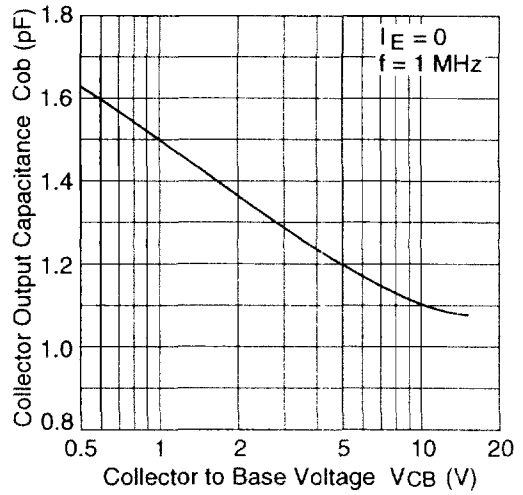
DC Current Transfer Ratio vs. Collector Current



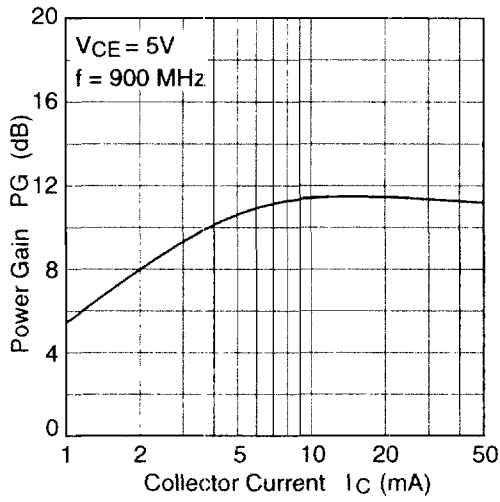
Gain Bandwidth Product vs. Collector Current



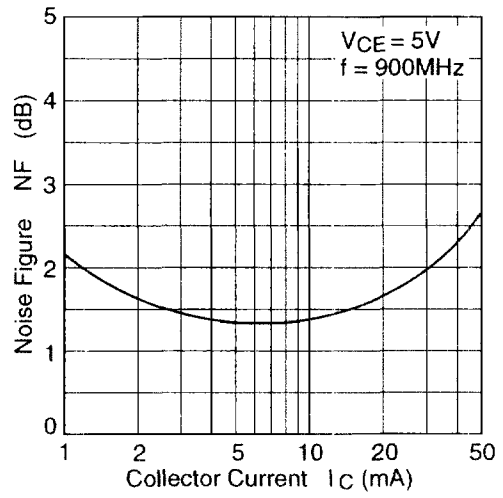
Collector Output Capacitance vs. Collector to Base Voltage



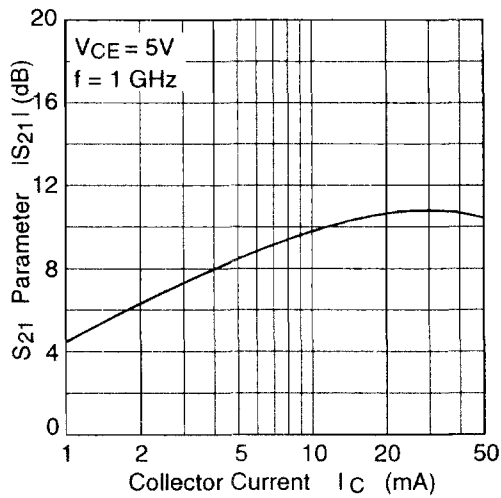
Power Gain vs. Collector Current



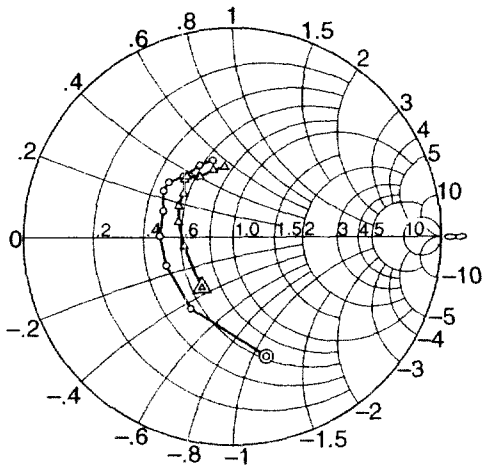
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current



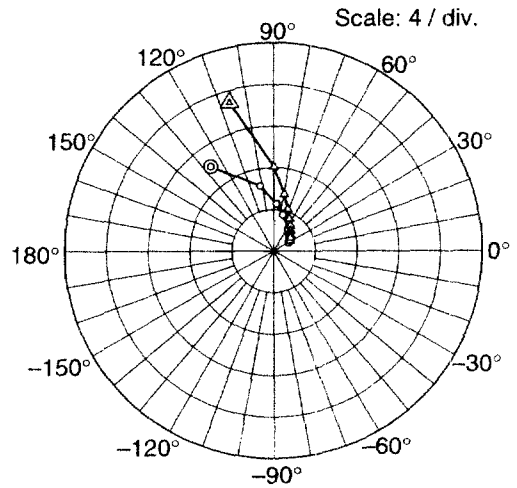
S11 Parameter vs. Frequency



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

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

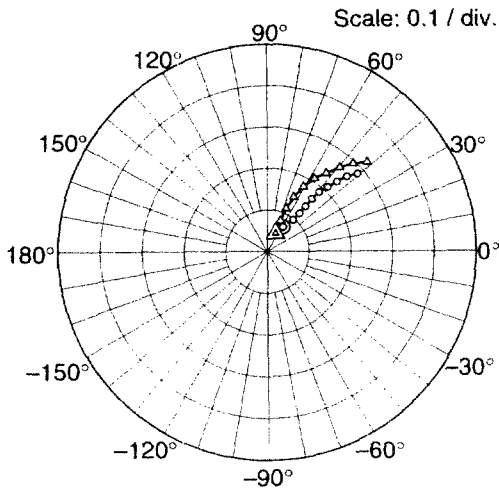
S21 Parameter vs. Frequency



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

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

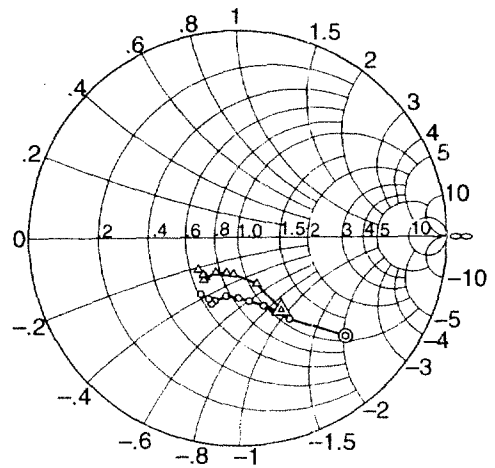
S12 Parameter vs. Frequency



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)

○ — ○ ($I_C = 5\text{ mA}$)
△ — △ ($I_C = 10\text{ mA}$)

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.
200	0.594	-74.3	10.08	126.4	0.0692	57.8	0.697	-42.8
400	0.397	-120.6	6.39	101.7	0.0970	51.2	0.462	-58.2
600	0.347	-156.9	4.57	86.7	0.119	50.2	0.348	-69.9
800	0.351	179.2	3.56	75.5	0.141	50.3	0.310	-80.8
1000	0.358	159.6	2.92	66.0	0.165	50.1	0.291	-89.8
1200	0.400	146.2	2.47	57.7	0.188	48.8	0.289	-101.7
1400	0.405	139.4	2.15	49.1	0.211	46.9	0.323	-110.5
1600	0.377	129.4	1.92	41.7	0.236	45.1	0.342	-112.2
1800	0.380	115.1	1.75	35.5	0.262	43.5	0.326	-115.8
2000	0.380	104.6	1.58	29.0	0.285	40.9	0.324	-123.2

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

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.282	-121.9	14.86	106.5	0.0471	65.9	0.404	-59.9
400	0.239	-169.9	8.09	89.6	0.0793	67.5	0.238	-68.4
600	0.274	164.3	5.52	79.4	0.112	66.7	0.180	-82.8
800	0.302	150.3	4.21	71.0	0.145	64.1	0.178	-97.4
1000	0.317	138.5	3.42	63.6	0.178	60.9	0.179	-108.3
1200	0.362	129.9	2.88	56.7	0.208	57.3	0.198	-123.1
1400	0.367	127.2	2.49	49.6	0.234	53.2	0.245	-129.9
1600	0.331	118.9	2.21	43.1	0.265	49.4	0.261	-129.2
1800	0.336	106.6	2.00	37.5	0.294	45.9	0.245	-133.3
2000	0.340	97.0	1.82	31.7	0.320	41.9	0.244	-141.3