2SC4875

Silicon NPN Epitaxial

HITACHI

Application

VHF / UHF wide band amplifier

Features

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

Outline

TO-92 (2)

1. Base
2. Emitter
3. Collector

Hitachi semiconductor

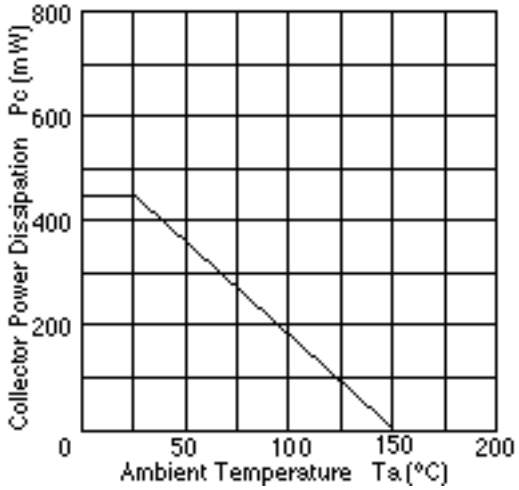
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	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	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

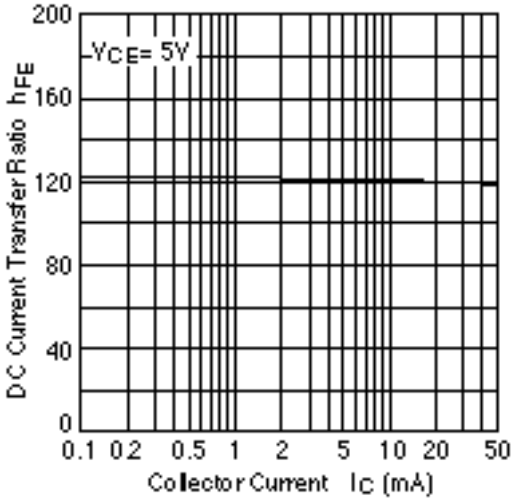
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10 µA, 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} = ∞
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	Cob	—	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

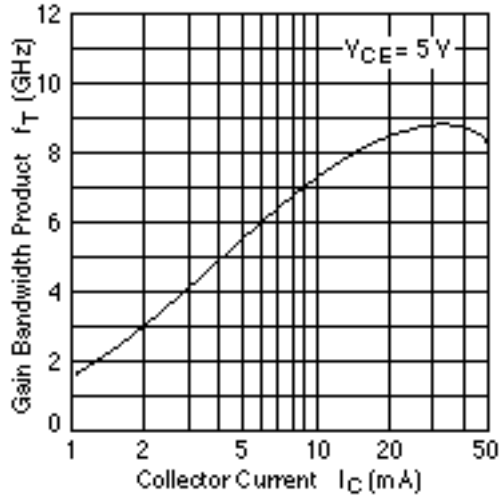
Maximum Collector Dissipation Curve



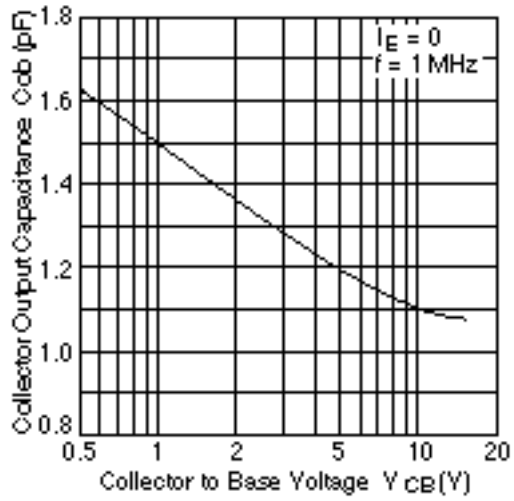
DC Current Transfer Ratio vs. Collector Current



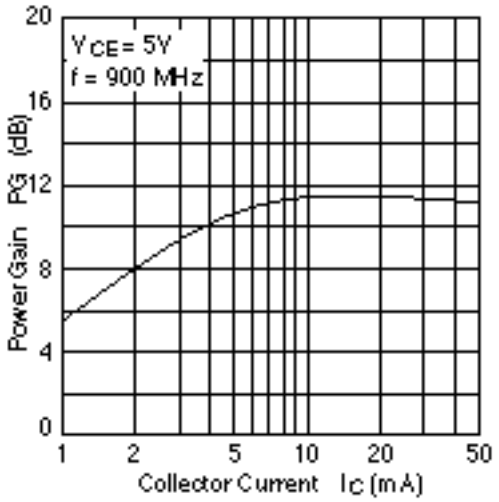
Gain Bandwidth Product vs. Collector Current



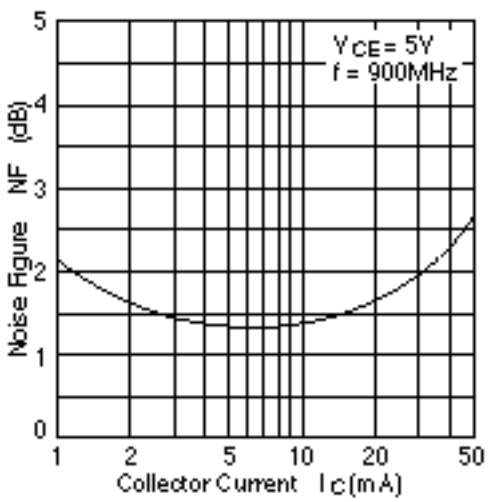
Collector Output Capacitance vs. Collector to Base Voltage



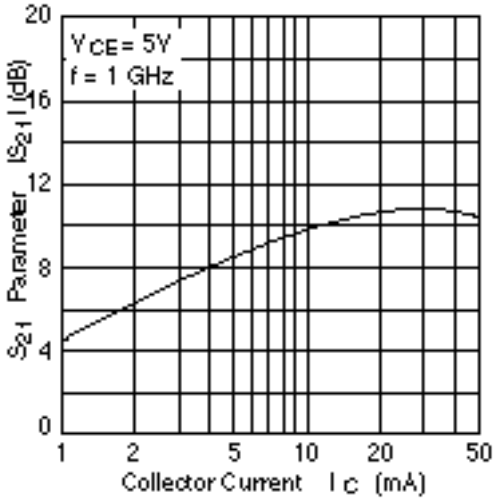
Power Gain vs. Collector Current



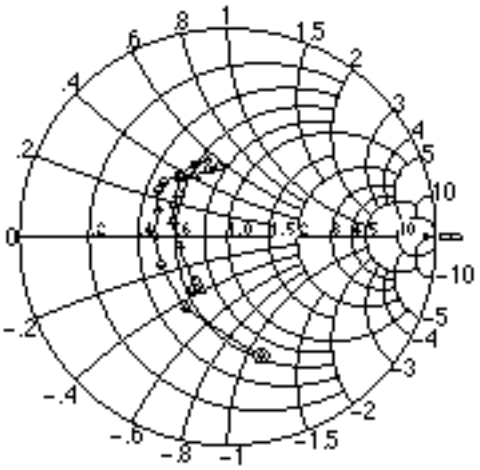
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current

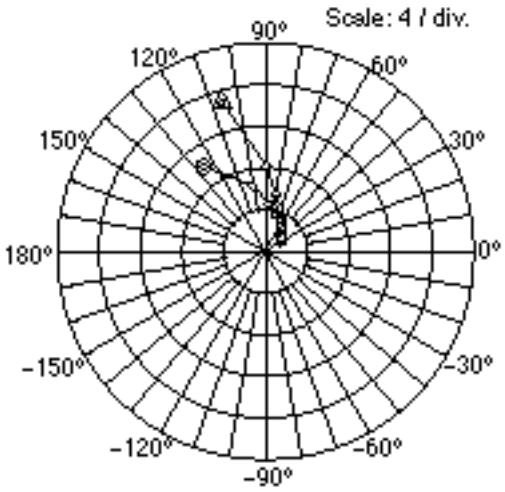


S11 Parameter vs. Frequency



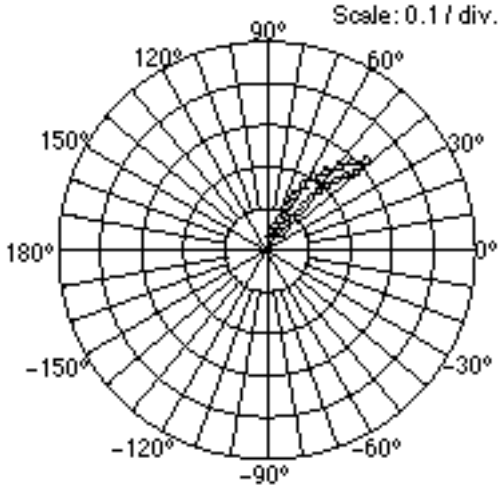
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S21 Parameter vs. Frequency



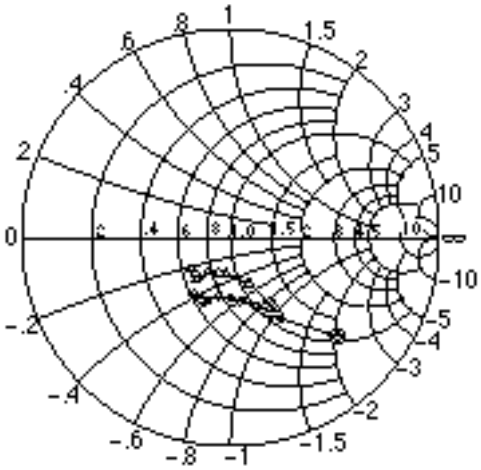
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(IC = 5 mA)
(IC = 20 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 10 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.
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 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.
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

When using this document, keep the following in mind:

1. This document may, wholly or partially, be subject to change without notice.
2. All rights are reserved: No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without Hitachi's permission.
3. Hitachi will not be held responsible for any damage to the user that may result from accidents or any other reasons during operation of the user's unit according to this document.
4. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Hitachi's semiconductor products. Hitachi assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
5. No license is granted by implication or otherwise under any patents or other rights of any third party or Hitachi, Ltd.
6. MEDICAL APPLICATIONS: Hitachi's products are not authorized for use in MEDICAL APPLICATIONS without the written consent of the appropriate officer of Hitachi's sales company. Such use includes, but is not limited to, use in life support systems. Buyers of Hitachi's products are requested to notify the relevant Hitachi sales offices when planning to use the products in MEDICAL APPLICATIONS.

HITACHI

Hitachi, Ltd.
Semiconductor & IC Div.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100, Japan
Tel: Tokyo (03) 3270-2111
Fax: (03) 3270-5109

For further information write to:

Hitachi America, Ltd.
Semiconductor & IC Div.
2000 Sierra Point Parkway
Brisbane, CA. 94005-1835
U.S.A.
Tel: 415-589-8300
Fax: 415-583-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 91 80-0
Fax: 089-9 29 30 00

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27306071