2SC4903

Silicon NPN Bipolar Transistor

HITACHI

Application

VHF / UHF wide band amplifier

Features

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

Outline

CMPAK

1. Emitter
2. Base
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	30	mA
Collector power dissipation	P_C	100	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

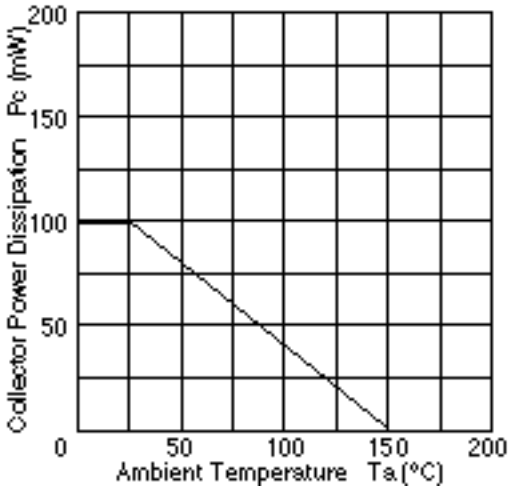
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector cutoff current	I_{CBO}	—	—	10	µA	V_{CB} = 20 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 = 10 mA
Output capacitance	Cob	—	0.6	1.0	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	4.0	6.0	—	GHz	V_{CE} = 5 V, I_C = 10 mA
Power gain	PG	9.5	12.0	—	dB	V_{CE} = 5 V, I_C = 10 mA, f = 900 MHz
Noise figure	NF	—	1.6	3.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

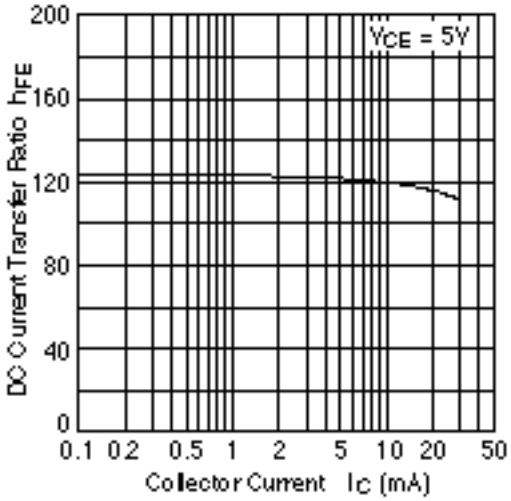
Note: 1. Marking for 2SC4903 is “YL–”.

Attention: This is electrostatic sensitive device.

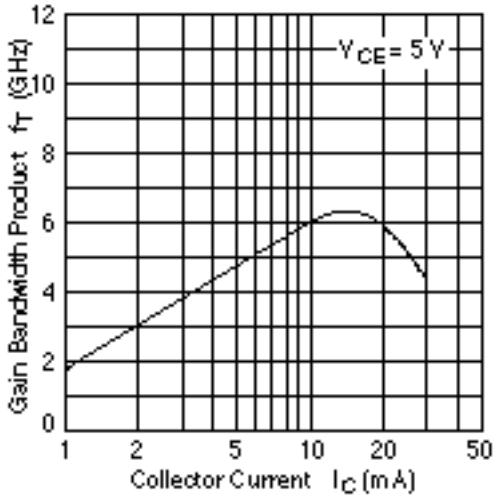
Maximum Collector Power Dissipation Curve



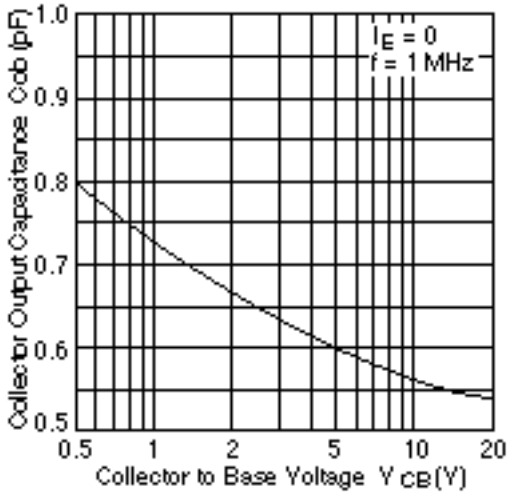
DC Current Transfer Ratio vs. Collector Current



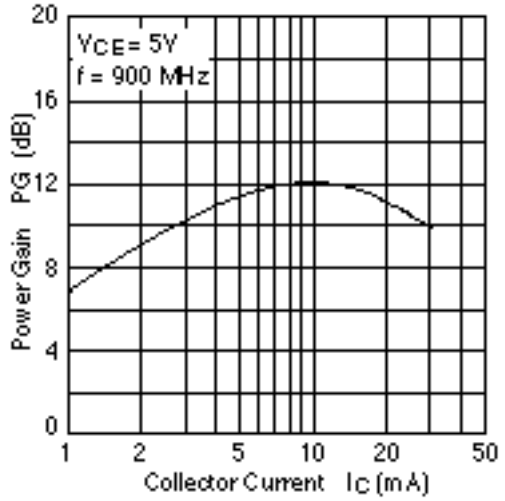
Gain Bandwidth Product vs. Collector Current



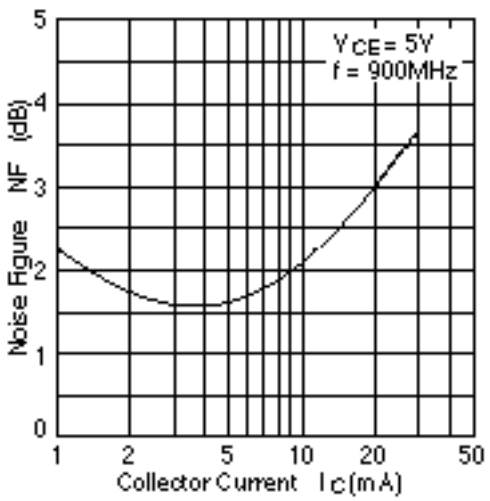
Collector Output Capacitance vs. Collector to Base Voltage



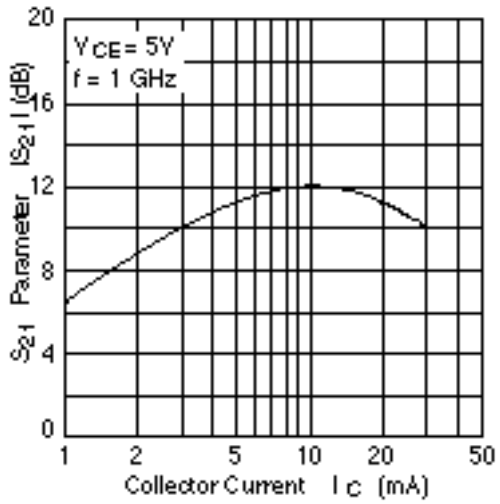
Power Gain vs. Collector Current



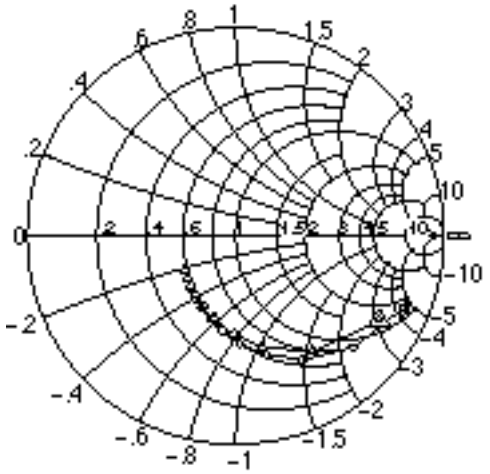
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current

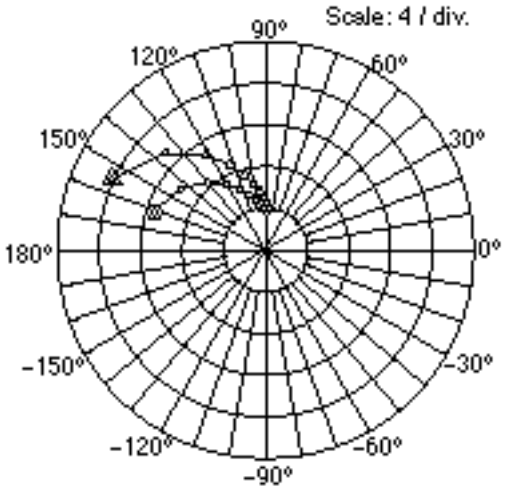


S11 Parameter vs. Frequency



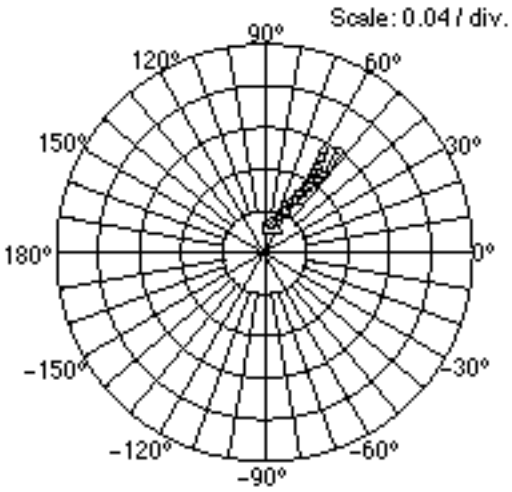
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 MHz to 1000 MHz (100 MHz step)
(I C = 5 mA)
(I C = 10 mA)

S21 Parameter vs. Frequency



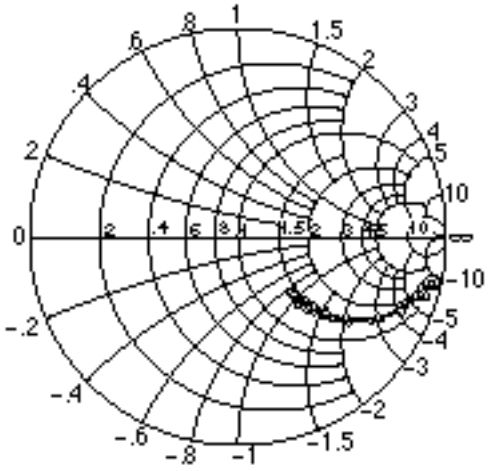
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 MHz to 1000 MHz (100 MHz step)
(Ic = 5 mA)
(Ic = 10 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
100 MHz to 1000 MHz (100 MHz step)
(I C = 5 mA)
(I C = 10 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
100 MHz to 1000 MHz (100 MHz step)
(Ic = 5 mA)
(Ic = 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.
100	0.872	–23.3	11.28	161.2	0.0266	77.9	0.956	–13.4
200	0.777	–43.6	10.03	144.3	0.0493	67.3	0.862	–24.4
300	0.672	–62.0	8.59	130.8	0.0661	60.2	0.759	–32.4
400	0.586	–75.7	7.36	121.0	0.0777	56.0	0.672	–37.4
500	0.517	–88.0	6.34	112.8	0.0866	53.6	0.604	–40.7
600	0.462	–98.0	5.52	106.4	0.0941	53.1	0.553	–43.0
700	0.417	–107.3	4.88	101.1	0.102	52.5	0.514	–44.6
800	0.384	–115.9	4.39	96.5	0.108	52.7	0.483	–46.0
900	0.359	–122.7	3.97	92.2	0.115	53.3	0.460	–46.9
1000	0.336	–130.8	3.63	88.5	0.121	53.4	0.441	–48.3

S Parameter (V_{CE} = 5 V, I_C = 10 mA, Z_O = 50 Ω, Emitter common)

FReq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.798	–30.5	16.22	155.6	0.0254	74.9	0.921	–17.5
200	0.666	–56.4	13.39	136.1	0.0442	63.8	0.780	–30.3
300	0.550	–76.4	10.76	122.3	0.0569	58.9	0.652	–37.3
400	0.470	–90.8	8.80	113.0	0.0663	57.1	0.561	–41.0
500	0.412	–104.2	7.39	105.6	0.0741	56.5	0.500	–43.1
600	0.373	–114.0	6.33	100.3	0.0821	57.2	0.456	–44.1
700	0.345	–123.6	5.53	95.5	0.0899	57.9	0.425	–44.9
800	0.322	–131.5	4.91	91.6	0.0973	58.5	0.401	–45.4
900	0.307	–138.7	4.41	87.8	0.106	59.4	0.384	–46.0
1000	0.294	–145.5	4.02	84.8	0.114	59.9	0.371	–46.8

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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