2SC4807

Silicon NPN Epitaxial

HITACHI

ADE-208-1122A (Z)
2nd. Edition
Mar. 2001

Application

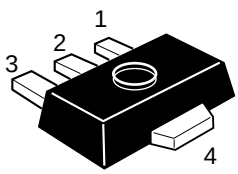
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 4.4 GHz Typ
- High output power
  1 dB Power compression point Pcp = 24 dBm Typ at V_{CE} = 5V , I_C = 100 mA , f = 900 MHz

Outline

UPAK



1. Base
2. Collector
3. Emitter
4. Collector (Flange)

Note: Marking is “ER”.

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

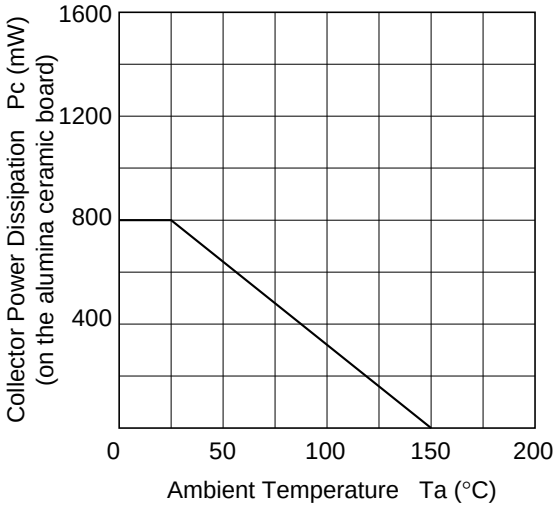
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	15	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	200	mA
Collector power dissipation	P_C*[1]	800	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: 1. Value on the alumina ceramics board (12.5 x 20 x 0.7 mm)

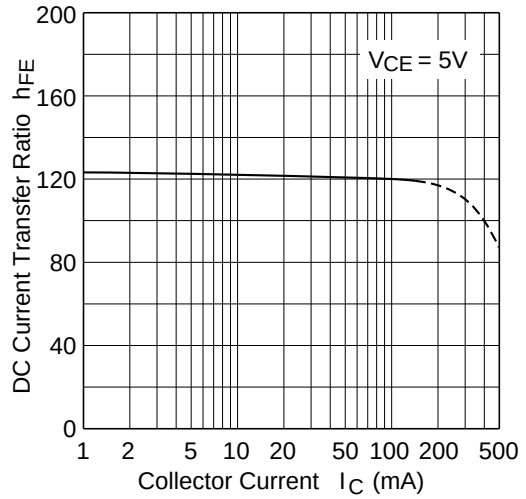
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	20	30	—	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} = 15 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 = 100 mA
Collector output capacitance	Cob	—	2.8	4.0	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	3.0	4.4	—	GHz	V_{CE} = 5 V, I_C = 100 mA
Power gain	PG	5.0	7.0	—	dB	V_{CE} = 5 V, I_C = 100 mA, f = 900 MHz
Noise figure	NF	—	2.5	4.0	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz

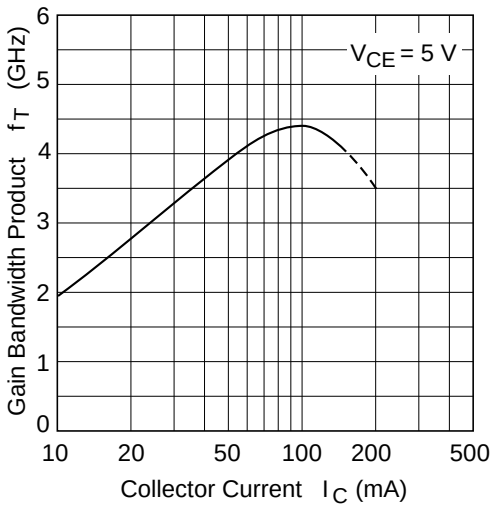
Maximum Collector Dissipation Curve



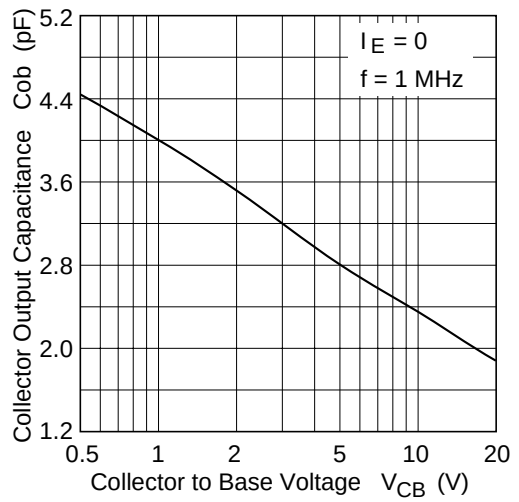
DC Current Transfer Ratio
vs. Collector Current



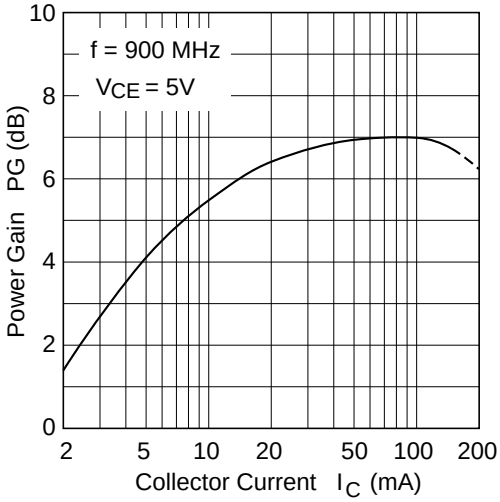
Gain Bandwidth Product
vs. Collector Current



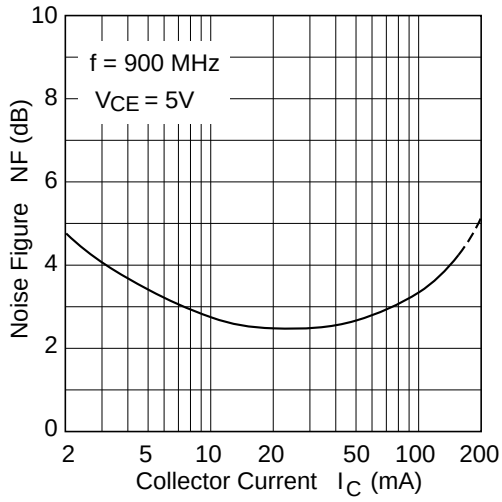
Collector Output Capacitance vs.
Collector to Base Voltage



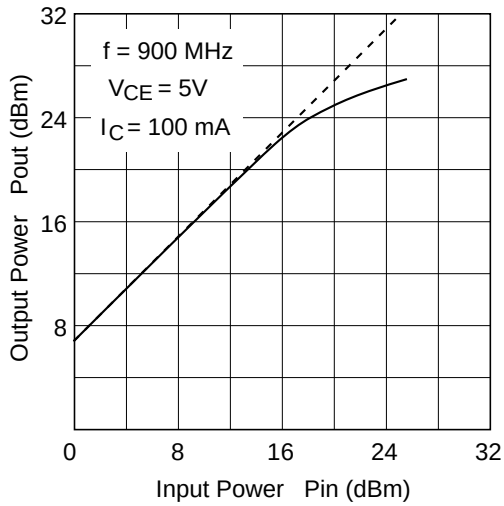
Power Gain vs. Collector Current



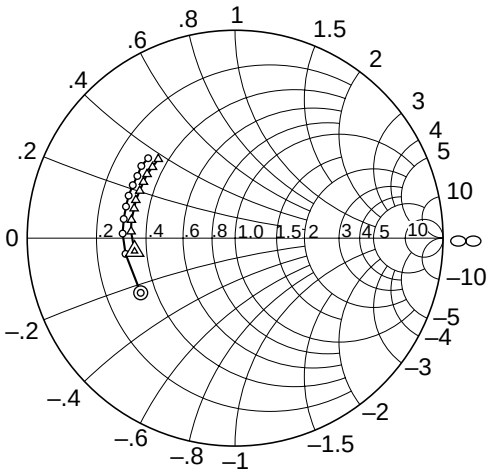
Noise Figure vs. Collector Current



Output Power vs. Input Power

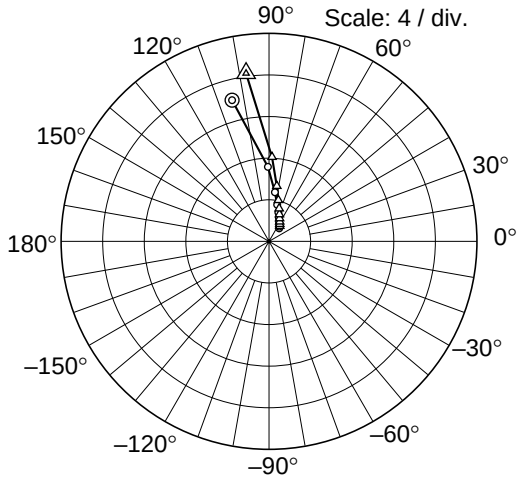


S11 Parameter vs. Frequency



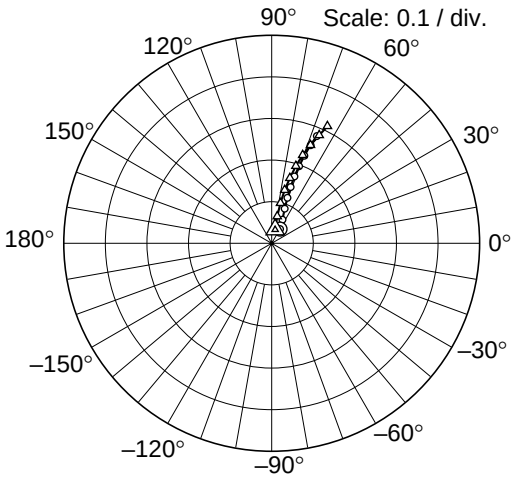
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 20 mA)
(I_C = 100 mA)

S21 Parameter vs. Frequency



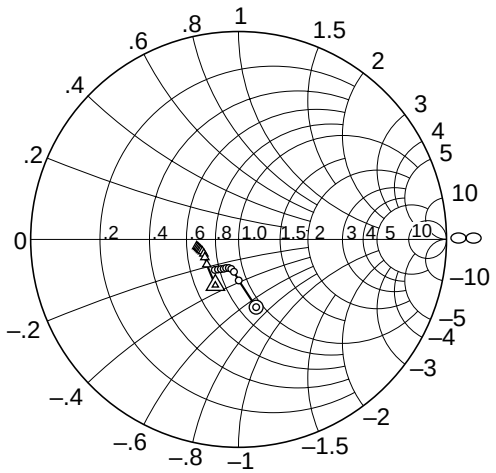
Condition: V_{CE} = 5 V , Zo = 50 Ω
100 to 1000 MHz (100 MHz step)
(I_C = 20 mA)
(I_C = 100 mA)

S12 Parameter vs. Frequency



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

S22 Parameter vs. Frequency



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

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

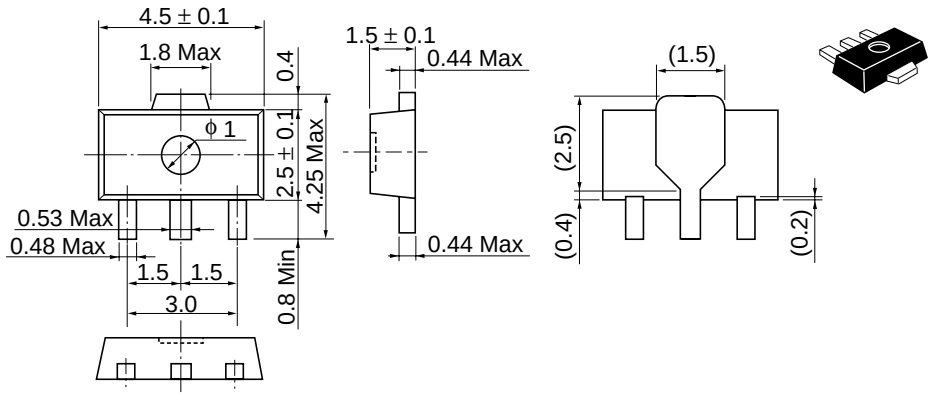
Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.525	–150.0	14.03	104.7	0.039	58.4	0.336	–75.5
200	0.533	–171.9	7.16	90.9	0.063	65.7	0.197	–89.9
300	0.542	177.6	4.75	83.2	0.089	69.6	0.157	–98.3
400	0.544	170.2	3.60	77.5	0.116	71.0	0.146	–104.0
500	0.547	163.8	2.91	72.1	0.143	71.5	0.145	–109.0
600	0.552	158.2	2.46	67.4	0.170	71.3	0.150	–113.7
700	0.555	152.6	2.14	63.3	0.197	70.5	0.158	–117.1
800	0.558	147.5	1.90	59.3	0.225	69.6	0.166	–121.0
900	0.570	142.4	1.72	55.2	0.254	68.4	0.175	–124.6
1000	0.569	137.4	1.58	51.9	0.280	67.2	0.186	–128.1

S Parameter (V_{CE} = 5 V, I_C = 100 mA, Z_O = 50 Ω, Emitter Common)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.488	–172.8	16.32	97.8	0.034	76.2	0.248	–116.9
200	0.502	176.3	8.08	88.0	0.066	78.6	0.195	–141.9
300	0.507	170.0	5.34	82.0	0.099	77.8	0.184	–152.2
400	0.507	163.6	4.03	77.2	0.132	76.4	0.181	–157.9
500	0.514	159.0	3.27	72.8	0.163	74.5	0.184	–161.8
600	0.513	153.6	2.75	68.8	0.195	72.7	0.189	–164.0
700	0.518	148.5	2.40	65.1	0.225	70.7	0.192	–165.8
800	0.524	144.0	2.13	61.3	0.254	68.5	0.196	–167.6
900	0.525	139.3	1.93	57.8	0.284	66.3	0.200	–169.4
1000	0.531	134.2	1.77	54.6	0.312	64.6	0.205	–170.8

Package Dimensions

As of January, 2001
Unit: mm



Hitachi Code	UPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.050 g

Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

HITACHI

Hitachi, Ltd.
Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL
NorthAmerica : http://semiconductor.hitachi.com/
Europe : http://www.hitachi-eu.com/hel/ecg
Asia : http://sicapac.hitachi-asia.com
Japan : http://www.hitachi.co.jp/Sicd/indx.htm

For further information write to:

Hitachi Semiconductor (America) Inc.
179 East Tasman Drive,
San Jose,CA 95134
Tel: <1> (408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straβe 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel : <65>-538-6533/538-8577
Fax : <65>-538-6933/538-3877
URL : http://www.hitachi.com.sg

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel : <886>-(2)-2718-3666
Fax : <886>-(2)-2718-8180
Telex : 23222 HAS-TP
URL : http://www.hitachi.com.tw

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon,
Hong Kong
Tel : <852>-(2)-735-9218
Fax : <852>-(2)-730-0281
URL : http://www.hitachi.com.hk

Colophon 2.0