

2SC5700

Silicon NPN Epitaxial
VHF/UHF wide band amplifier

HITACHI

ADE-208-1435 (Z)

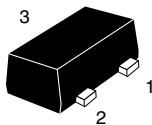
Rev.0
Jul. 2001

Features

- High power gain low noise figure at low power operation:
 $|S_{21}|^2 = 16$ dB typ, NF = 1.0 dB typ ($V_{CE} = 1$ V, $I_C = 5$ mA, $f = 900$ MHz)

Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WB-".

Absolute Maximum Ratings

(Ta = 25 °C)

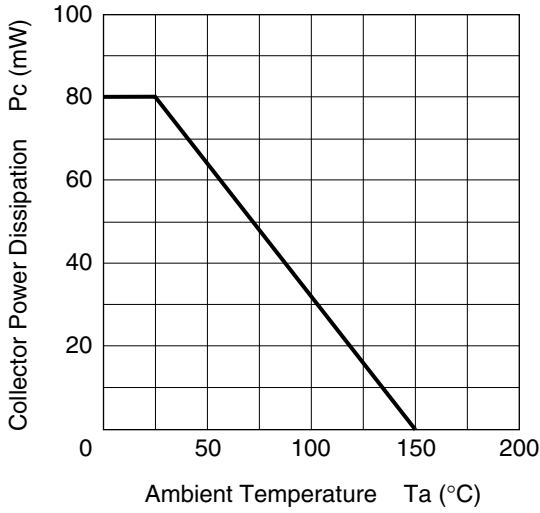
Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	4	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Electrical Characteristics

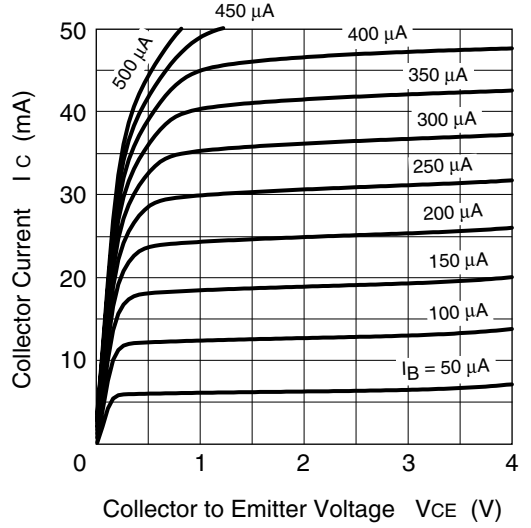
(Ta = 25°C)

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}	—	—	0.1	μA	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 4 V, R_{BE} = \text{Infinite}$
Emitter cutoff current	I_{EBO}	—	—	200	nA	$V_{EB} = 0.8 V, I_C = 0$
DC current transfer ratio	h_{FE}	100	130	170	—	$V_{CE} = 1 V, I_C = 5 mA$
Collector output capacitance	C_{ob}	—	0.4	0.7	pF	$V_{CB} = 1 V, I_E = 0,$ $f = 1 MHz$
Gain bandwidth product	f_T	10	12	—	GHz	$V_{CE} = 1 V, I_C = 5 mA$
Forward transmission coefficient	$ S_{21} ^2$	13	16	—	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1 V, I_C = 5 mA,$ $f = 900 MHz,$ $\Gamma_S = \Gamma_L = 50 \text{ ohm}$

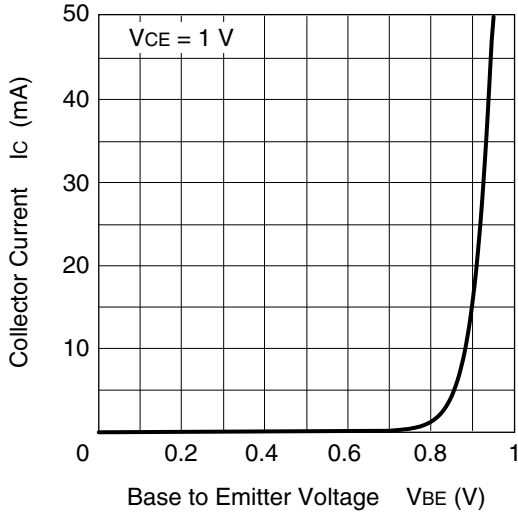
Collector Power Dissipation Curve



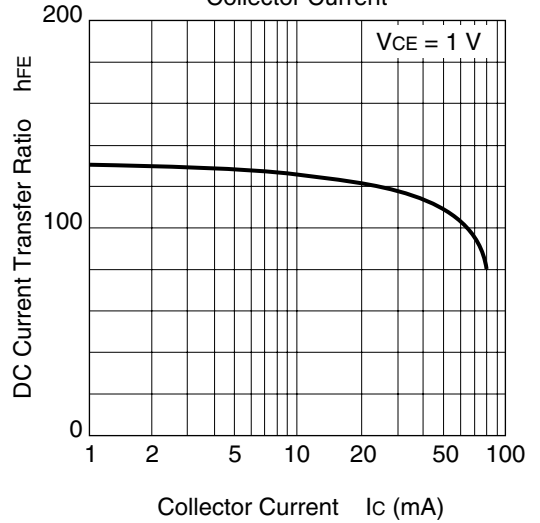
Typical Output Characteristics

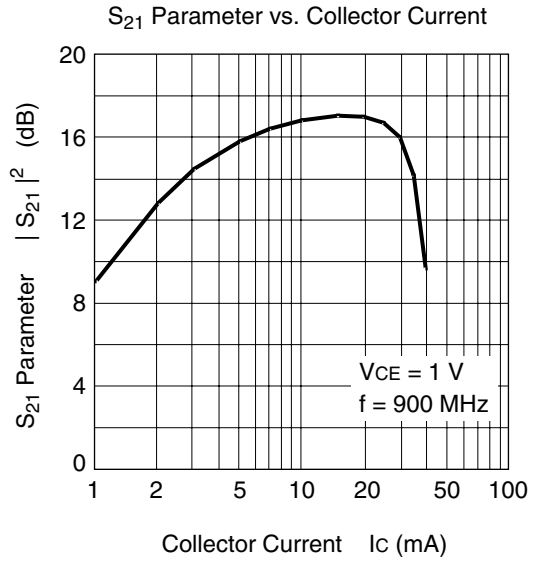
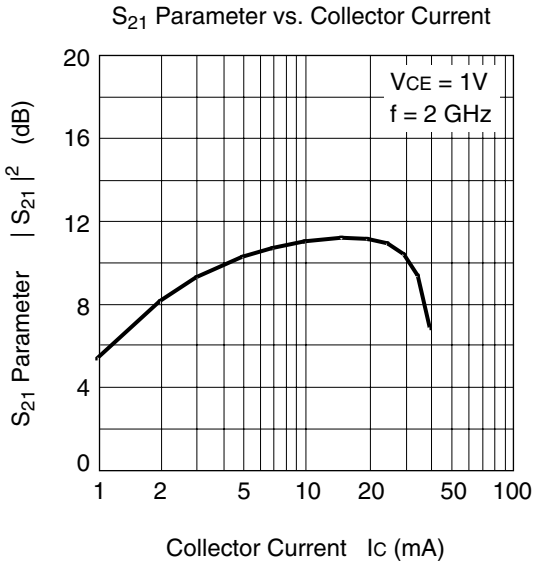
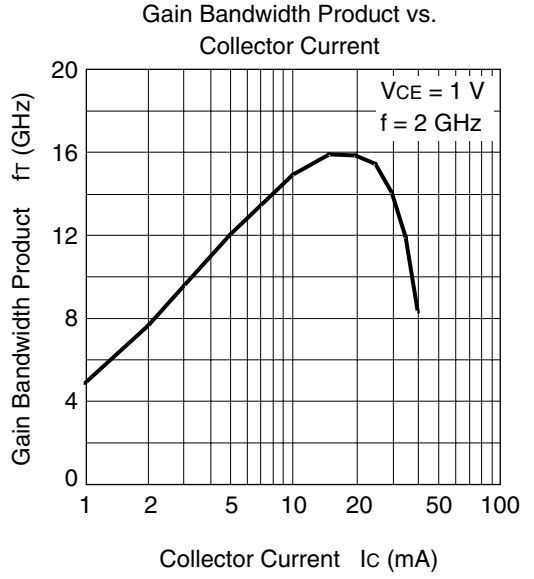
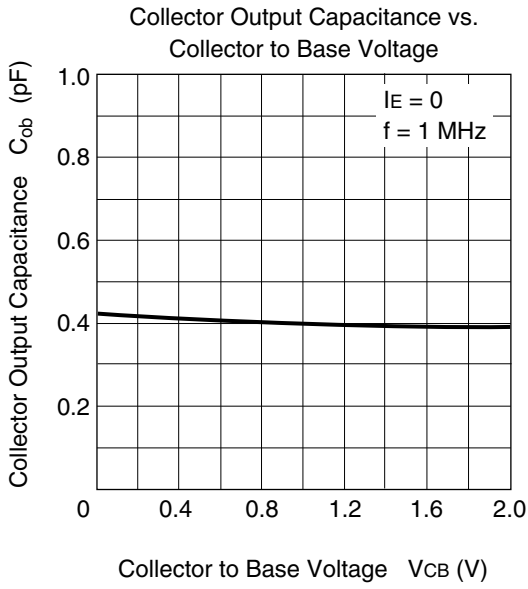


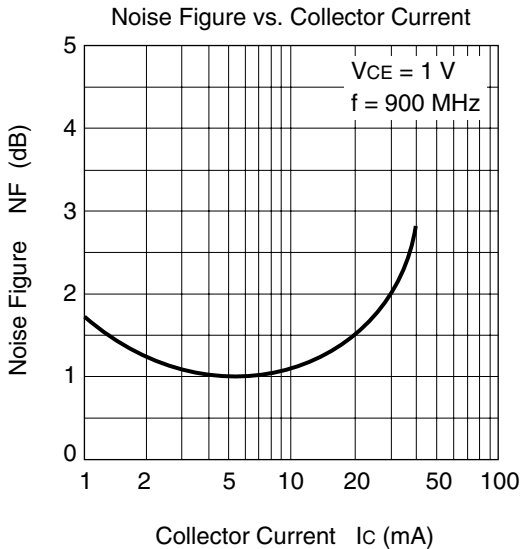
Typical Transfer Characteristics



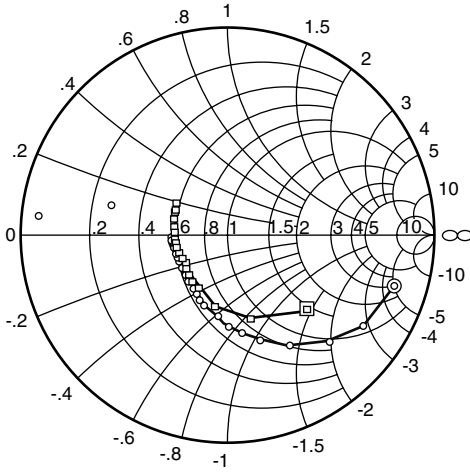
DC Current Transfer Ratio vs. Collector Current





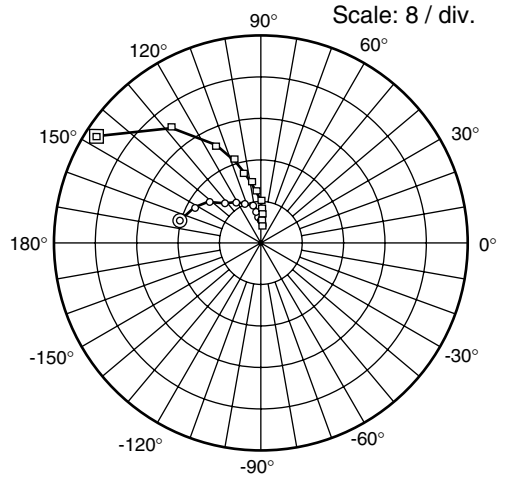


S_{11} Parameter vs. Frequency



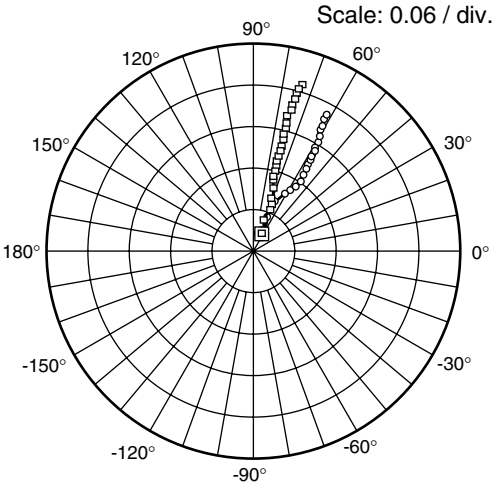
Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{21} Parameter vs. Frequency



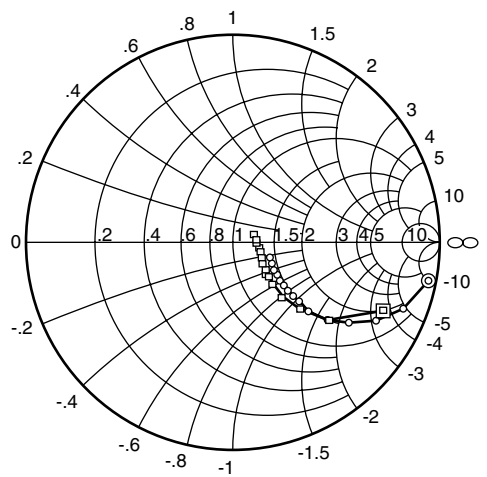
Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{12} Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S_{22} Parameter vs. Frequency



Condition: $V_{CE} = 1\text{ V}$, $Z_O = 50\ \Omega$
 100 to 2000 MHz (100 MHz Step)
 ○ — ○ ($I_C = 5\text{ mA}$)
 □ — □ ($I_C = 20\text{ mA}$)

S Parameter

 $(V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, Z_0 = 50 \Omega)$

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.855	-16.3	15.67	165.4	0.018	81.2	0.962	-10.7
200	0.784	-32.7	14.42	152.1	0.035	72.2	0.889	-20.9
300	0.703	-48.4	12.92	140.6	0.048	65.3	0.791	-28.9
400	0.616	-60.4	11.41	131.2	0.059	61.2	0.698	-34.6
500	0.540	-72.1	10.09	123.5	0.067	58.6	0.618	-38.2
600	0.475	-81.4	8.94	117.2	0.074	57.3	0.549	-40.7
700	0.428	-90.3	8.00	112.3	0.080	56.6	0.492	-42.1
800	0.385	-99.1	7.23	108.2	0.085	56.1	0.445	-42.5
900	0.348	-106.5	6.54	104.2	0.091	56.3	0.404	-42.7
1000	0.320	-113.6	6.00	100.9	0.096	57.3	0.373	-42.0
1100	0.297	-121.6	5.51	98.2	0.101	57.4	0.344	-41.6
1200	0.283	-128.8	5.14	95.4	0.106	57.8	0.321	-40.7
1300	0.271	-134.6	4.80	93.1	0.111	58.7	0.298	-39.1
1400	0.262	-142.4	4.47	90.8	0.117	59.2	0.283	-37.5
1500	0.254	-149.0	4.23	89.0	0.122	60.0	0.263	-36.3
1600	0.246	-155.3	3.99	87.0	0.128	60.5	0.252	-34.6
1700	0.248	-160.8	3.79	85.3	0.134	61.1	0.238	-33.0
1800	0.249	-167.3	3.59	83.7	0.140	61.5	0.226	-31.3
1900	0.253	-172.0	3.44	81.9	0.145	62.1	0.215	-29.6
2000	0.253	-177.5	3.29	80.5	0.151	62.7	0.204	-27.2

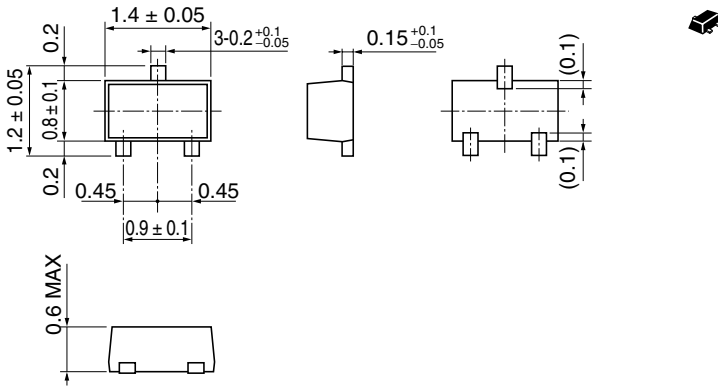
2SC5700

($V_{CE} = 1\text{ V}$, $I_C = 20\text{ mA}$, $Z_o = 50\ \Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.526	-43.0	37.91	148.3	0.015	75.0	0.817	-25.2
200	0.406	-76.6	27.98	127.5	0.025	67.3	0.605	-40.0
300	0.334	-100.0	20.76	115.3	0.033	66.9	0.453	-45.9
400	0.284	-116.6	16.30	108.1	0.040	68.0	0.360	-47.1
500	0.263	-131.4	13.33	103.0	0.047	69.8	0.300	-46.2
600	0.243	-143.4	11.24	99.2	0.055	71.1	0.257	-44.4
700	0.242	-152.6	9.74	96.3	0.063	72.0	0.226	-41.4
800	0.236	-159.6	8.57	93.6	0.071	72.7	0.203	-38.2
900	0.230	-167.8	7.62	91.4	0.078	73.5	0.184	-34.3
1000	0.239	-173.4	6.91	89.4	0.086	74.1	0.170	-30.5
1100	0.240	-179.4	6.31	87.7	0.094	73.9	0.160	-26.8
1200	0.247	175.6	5.82	85.9	0.102	74.1	0.150	-22.6
1300	0.246	172.4	5.38	84.4	0.110	74.4	0.143	-18.1
1400	0.255	167.4	5.02	82.9	0.117	74.3	0.138	-14.0
1500	0.257	163.8	4.71	81.3	0.126	74.2	0.133	-9.6
1600	0.265	160.2	4.45	80.1	0.134	74.4	0.130	-5.3
1700	0.268	158.7	4.19	78.9	0.142	74.2	0.128	-1.2
1800	0.282	154.1	3.97	77.6	0.149	73.9	0.125	2.5
1900	0.283	152.7	3.80	76.4	0.157	74.1	0.123	7.1
2000	0.300	150.3	3.63	75.4	0.165	73.7	0.123	11.8

Package Dimensions

As of January, 2001
Unit: mm



Hitachi Code	MFPAK
JEDEC	—
EIAJ	—
Mass (reference value)	0.0016 g

Disclaimer

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.

Sales Offices**HITACHI****Hitachi, Ltd.**

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

URL	North America	: 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 Ltd. Electronic Components Group Whitebrook Park Lower Cookham Road Maidenhead Berkshire SL6 8YA, United Kingdom Tel: <44> (1628) 585000 Fax: <44> (1628) 585200
--	--

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

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://semiconductor.hitachi.com.hk
--

Copyright © Hitachi, Ltd., 2001. All rights reserved. Printed in Japan.
Colophon 4.0