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





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	Pc	450	mW
Junction temperature	Тј	150	°C
Storage temperature	Tstg	–55 to +150	°C

Electrical Characteristics (Ta = 25° C)

Item	Symbol	Min	Тур	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{\rm (BR)CBO}$	15	—	_	V	$I_{c} = 10 \ \mu A, \ I_{E} = 0$
Collector cutoff current	I _{CBO}	_	—	10	μA	$V_{CB} = 12 \text{ V}, I_{E} = 0$
	I _{ceo}		_	1	mA	V_{ce} = 9 V, R_{be} =
Emitter cutoff current	I _{EBO}		—	10	μA	$V_{_{EB}} = 1.5 \text{ V}, \text{ I}_{_{C}} = 0$
DC current transfer ratio	\mathbf{h}_{FE}	50	120	250		V_{ce} = 5 V, I_c = 20 mA
Output capacitance	Cob		1.2	1.7	pF	$V_{_{CB}} = 5 \text{ V}, \text{ I}_{_{E}} = 0, \text{ f} = 1 \text{ MHz}$
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	$V_{ce} = 5 \text{ V}, I_c = 20 \text{ mA},$ f = 900 MHz
Noise figure	NF		1.3	2.5	dB	$V_{ce} = 5 \text{ V}, I_c = 5 \text{ mA},$ f = 900 MHz







HITACHI

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

S Parameter (V $_{\rm CE}$ = 5 V, $I_{\rm C}$ = 20 mA, $Z_{\rm O}$ = 50 $\,$, $\,$ 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 DV. Neppon Bidg, 2-5-2, Ohte-mach, Chiyoda-ku, Tokyo 100, Japan Tet Tokyo (03, 3270-2111 Fax (03, 3270-5109

For Auther in forms ion write to : Hischi America, Utd Semiconductor & IC DV. 2000 Sierre Point Perkway Briebena, CA. 94005-4835 U S.Å Tet 415-583-8300 Fax: 415-583-4207

Hitschi Burope GmbH Bectronic Components Group Cratinentsi Burope Danacher Straße 3 D-85522 Feldkirchen Minchen Tet 089-9 94 80-0 Fex: 089-9 29 30 00 Hitschi Burope Ltd. Bectronic Components Div. Northern Burope Headquerters Whitsbrock Ferk Lower Cock hem Roed hitidenheed Berkshire SLGSYÅ United Kingdom Tet 0628-585000 Fet: 0628-778322 Hitschi Asia Pta. Ltd 45 Collyer Quay \$20-00 Hitschi Tower Singspore 0404 Tet 535-2400 Fex 535-4533

Hitschi Asia (Hong Kong) Ltd. Unit 705, North Towar, World Finance Cantra, Harbour City, Carton Road Teim Sha Teut, Kowloon Hong Kong Tet 27350218 Fax: 27350218

HITACHI