
2SC4422

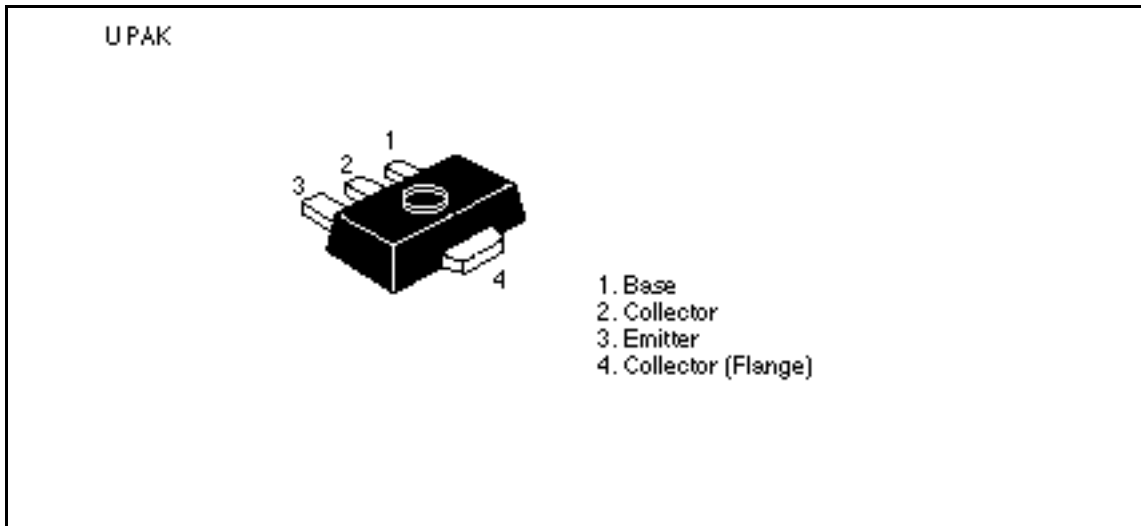
Silicon NPN Epitaxial

HITACHI

Application

VHF / UHF wide band amplifier

Outline



Absolute Maximum Ratings (Ta = 25°C)

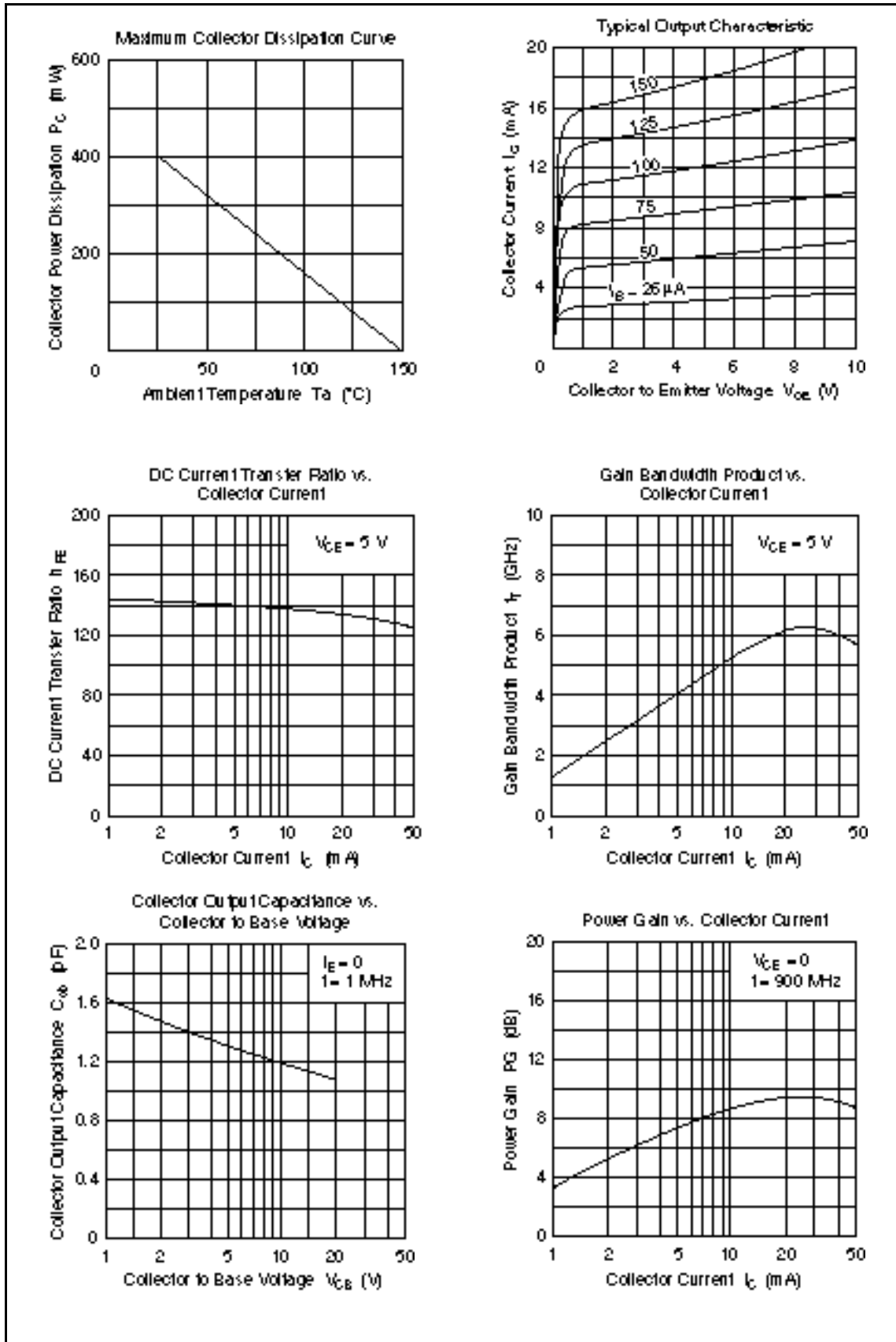
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	11	V
Emitter to base voltage	V_{EBO}	2	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	400	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

2SC4422

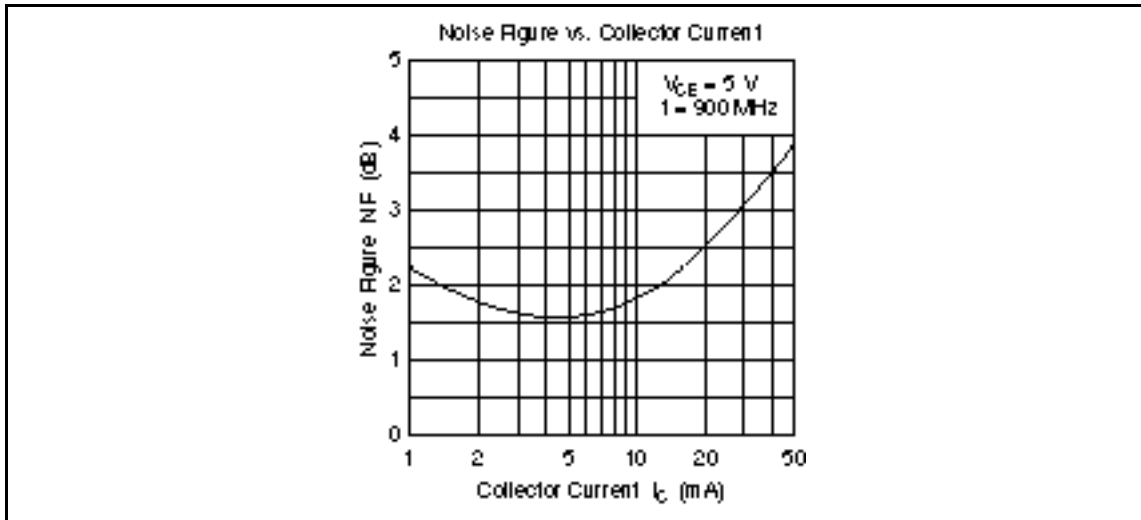
Electrical Characteristics (Ta = 25°C)

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}	—	—	1	μA	$V_{CB} = 12 V, I_E = 0$
	I_{CEO}	—	—	1	μA	$V_{CE} = 10 V, R_{BE} =$
Emitter cutoff current	I_{EBO}	—	—	1	μA	$V_{EB} = 1 V, I_C = 0$
DC current transfer ratio	h_{FE}	50	—	250		$V_{CE} = 5 V, I_C = 20 mA$
Collector output capacitance	C_{ob}	—	1.2	1.6	pF	$V_{CB} = 5 V, I_E = 0, f = 1 MHz$
Gain bandwidth product	f_T	4.5	6.0	—	GHz	$V_{CE} = 5 V, I_C = 20 mA$
Power gain	PG	7.0	9.0	—	dB	$V_{CE} = 5 V, I_C = 20 mA,$ $f = 900 MHz$
Noise figure	NF	—	1.6	3.0	dB	$V_{CE} = 5 V, I_C = 5 mA,$ $f = 900 MHz$

Note: Marking is "CR".



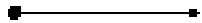

2SC4422

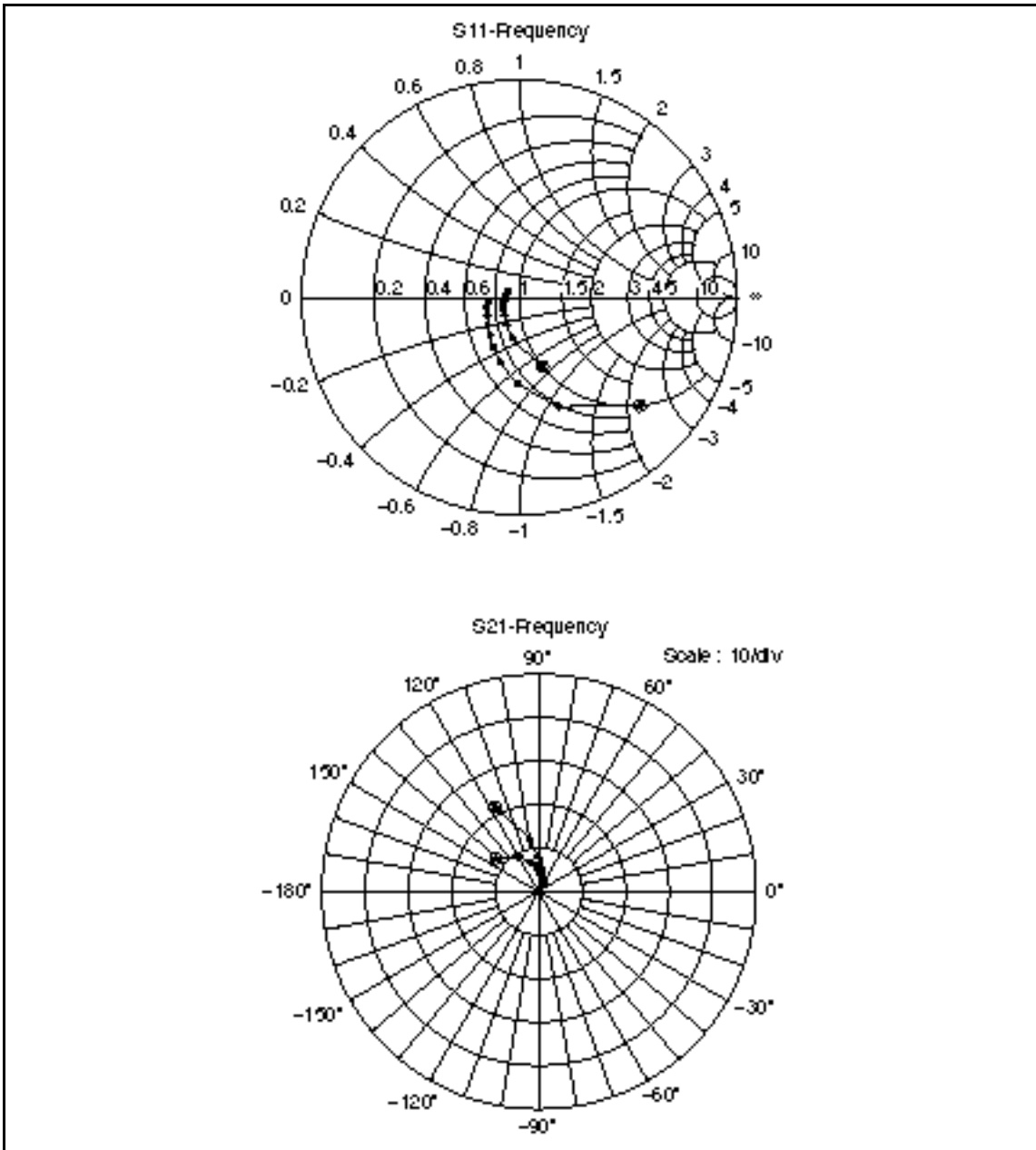


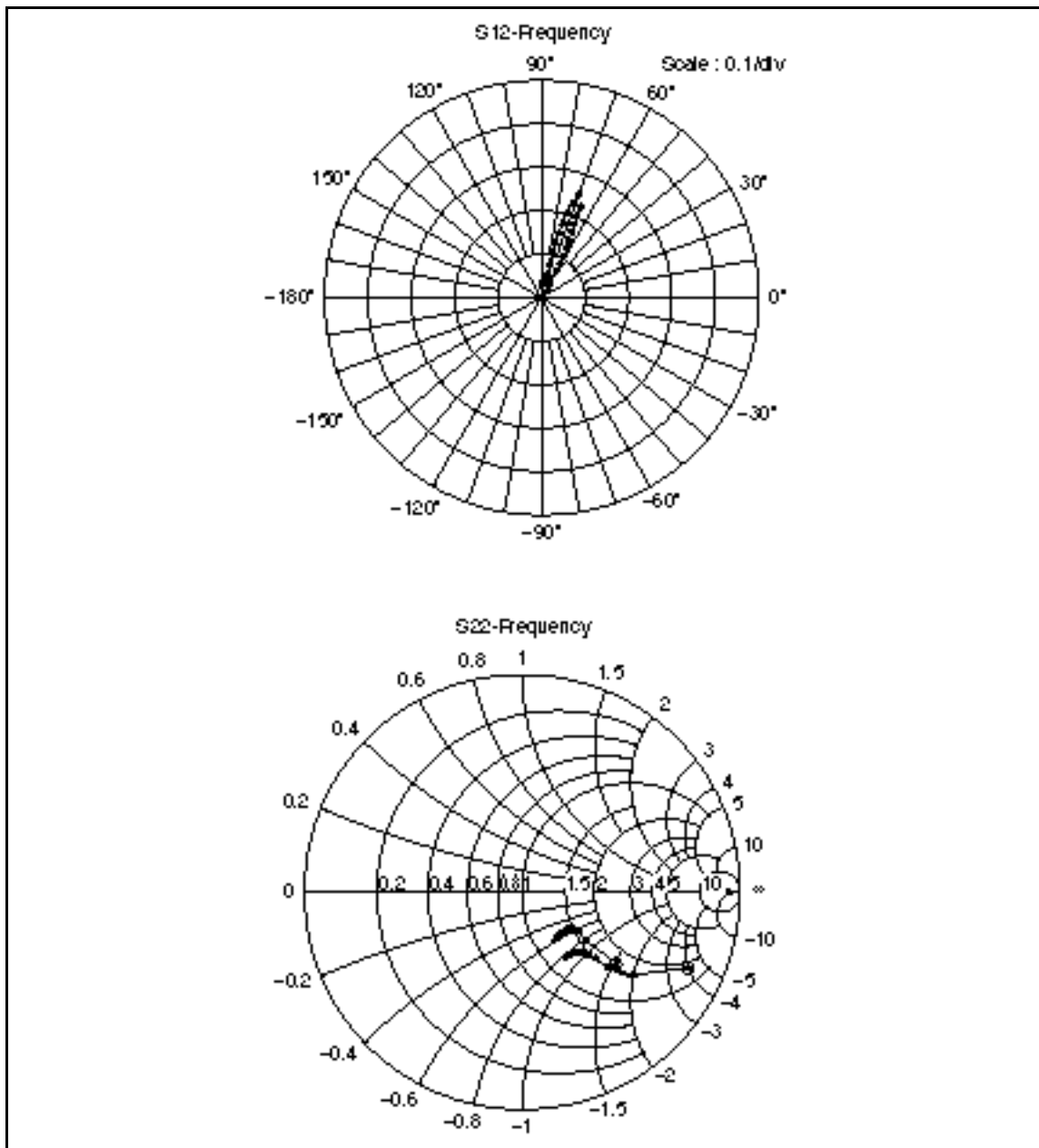
HITACHI

S Parameters (Emitter Common)

Test Condition $V_{CE} = 5\text{ V}$, 100 MHz to 1000 MHz (100 MHz Step), $Z_o = 50$

$I_C = 5\text{ mA}$ 
 $I_C = 10\text{ mA}$ 





S Parameters (Emitter Common)**Test Condition** $V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$, $Z_0 = 50$

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.747	-42.0	12.471	143.1	0.044	69.5	0.840	-24.6
200	0.534	-70.3	8.958	119.9	0.071	62.3	0.640	-36.3
300	0.394	-91.0	6.624	106.1	0.090	61.2	0.522	-40.4
400	0.310	-105.3	5.194	96.8	0.108	62.5	0.456	-42.4
500	0.258	-117.0	4.280	89.7	0.126	64.1	0.417	-43.7
600	0.216	-126.9	3.636	84.0	0.145	65.1	0.391	-45.4
700	0.193	-139.0	3.170	79.0	0.165	65.9	0.376	-47.5
800	0.167	-149.6	2.824	74.5	0.185	66.5	0.368	-50.0
900	0.157	-162.3	2.543	70.2	0.206	66.9	0.363	-53.1
1000	0.136	-171.9	2.326	66.6	0.227	67.0	0.362	-56.3

Test Condition $V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$, $Z_0 = 50$

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.333	-71.6	21.905	117.7	0.031	71.9	0.547	-37.3
200	0.192	-98.5	12.026	100.7	0.054	74.6	0.378	-37.6
300	0.135	-116.1	8.123	92.4	0.079	75.8	0.322	-35.5
400	0.107	-130.9	6.151	86.7	0.104	76.2	0.297	-35.7
500	0.088	-145.2	4.967	82.3	0.129	75.5	0.285	-36.6
600	0.078	-155.4	4.174	78.2	0.153	74.8	0.275	-38.8
700	0.069	-170.6	3.616	74.7	0.178	73.8	0.271	-42.0
800	0.060	176.2	3.201	71.1	0.203	72.8	0.268	-45.3
900	0.063	162.6	2.876	67.9	0.227	71.7	0.268	-49.3
1000	0.051	147.4	2.624	65.0	0.251	70.5	0.271	-53.5

2SC4422

Y Parameters (Emitter Common)

Test Condition $V_{CE} = 5\text{ V}$, $I_C = 5\text{ mA}$

Freq. (MHz)	Yie (mS)		Yfe (mS)		Yre (mS)		Yoe (mS)	
	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.
100	1.949	3.563	147.837	-43.785	-0.001	-0.544	0.175	0.922
200	3.994	5.961	120.026	-75.352	0.005	-1.122	0.218	1.731
300	6.433	7.295	89.506	-98.131	0.006	-1.711	0.206	2.618
400	8.206	7.536	62.937	-90.892	0.017	-2.299	0.250	3.531
500	9.403	7.501	43.528	-87.146	0.043	-2.877	0.295	4.395
600	10.179	7.259	29.375	-81.334	0.058	-3.445	0.421	5.324
700	10.910	7.124	19.483	-75.831	0.098	-4.063	0.387	6.235
800	11.193	6.776	11.803	-70.096	0.127	-4.642	0.413	7.209
900	11.543	6.593	6.205	-65.171	0.192	-5.302	0.338	8.218
1000	11.387	6.328	2.208	-60.095	0.249	-5.855	0.401	9.171

Test Condition $V_{CE} = 5\text{ V}$, $I_C = 20\text{ mA}$

Freq. (MHz)	Yie (mS)		Yfe (mS)		Yre (mS)		Yoe (mS)	
	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.	REAL	IMAG.
100	5.863	2.308	276.917	-268.988	0.000	-0.522	0.244	0.751
200	7.022	2.660	109.913	-221.759	0.005	-1.121	0.309	1.637
300	7.375	2.861	50.698	-167.756	0.006	-1.713	0.305	2.507
400	7.527	3.094	26.179	-133.425	0.024	-2.302	0.363	3.373
500	7.607	3.429	14.053	-110.501	0.025	-2.885	0.394	4.282
600	7.562	3.893	7.198	-94.442	0.056	-3.477	0.463	5.156
700	7.537	4.211	2.859	-82.874	0.079	-4.077	0.478	6.093
800	7.383	4.635	-0.221	-73.836	0.124	-4.674	0.506	7.046
900	7.403	5.047	-2.127	-67.183	0.180	-5.312	0.444	8.018
1000	7.074	5.411	-3.292	-61.241	0.246	-5.871	0.509	8.943

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., 2-5-2, Ohta-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 94005-4835
U.S.A.
Tel: 415-589-8000
Fax: 415-589-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 94 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.
45 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 705, North Tower,
World Finance Centre
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27308074