

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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# 2SC5623

## Silicon NPN Epitaxial High Frequency Low Noise Amplifier

# RENESAS

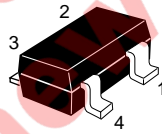
ADE-208-977 (Z)  
1st. Edition  
Nov. 2000

### Features

- High gain bandwidth product  
 $f_T = 26 \text{ GHz typ.}$
- High power gain and low noise figure ;  
 $PG = 18 \text{ dB typ. , } NF = 1.8 \text{ dB typ. at } f = 1.8 \text{ GHz}$

### Outline

CMPAK-4



1. Emitter
2. Collector
3. Emitter
4. Base

Note: Marking is "WH-".

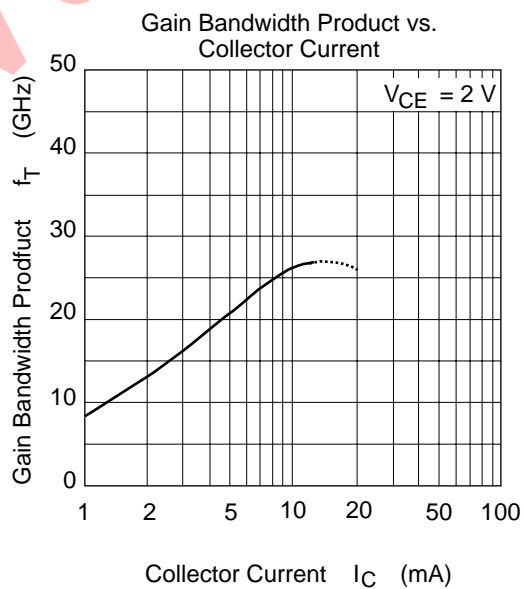
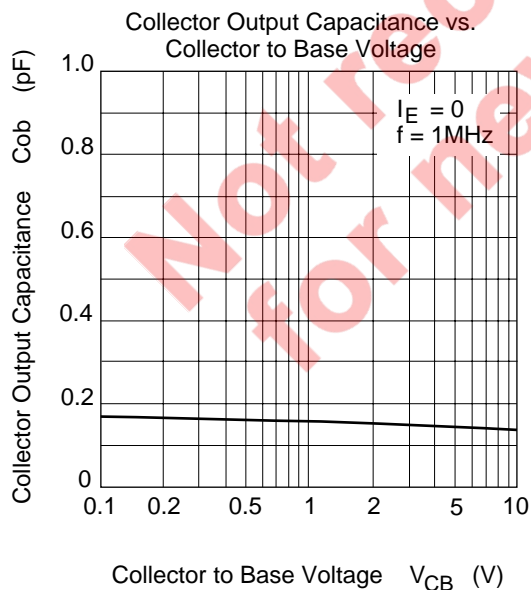
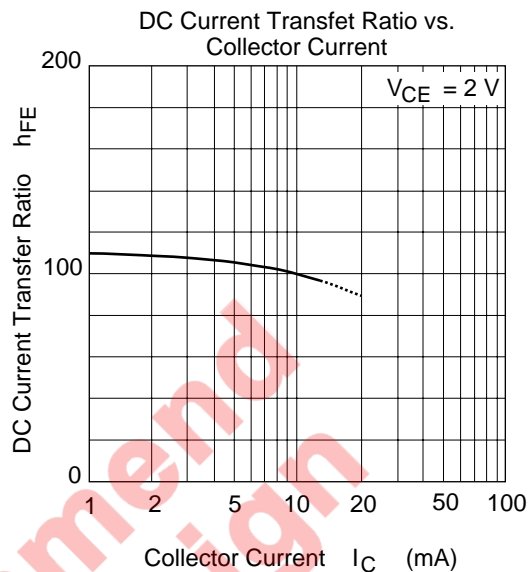
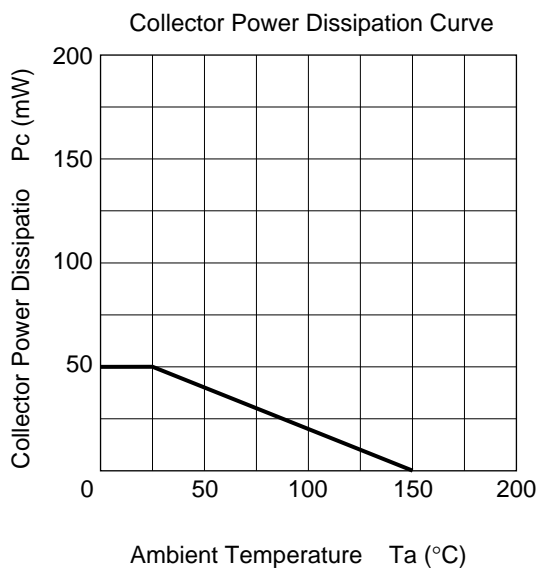
## Absolute Maximum Ratings (Ta = 25°C)

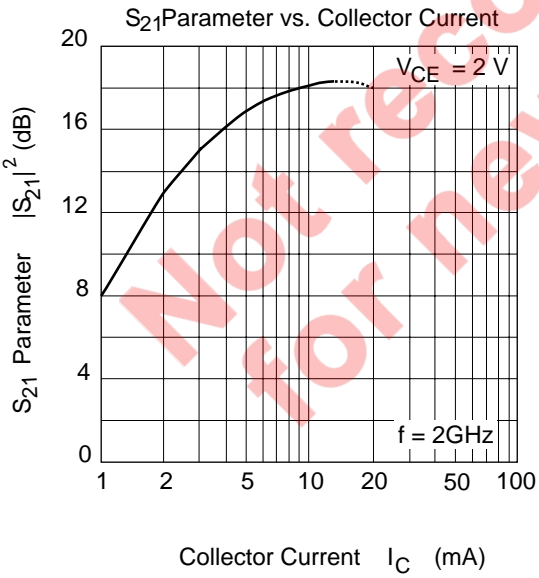
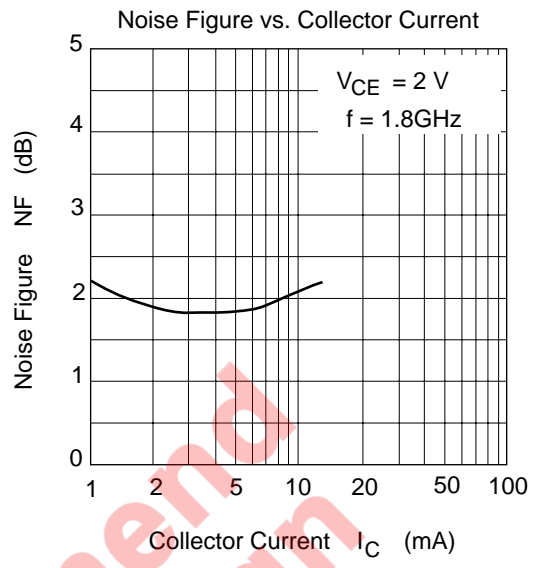
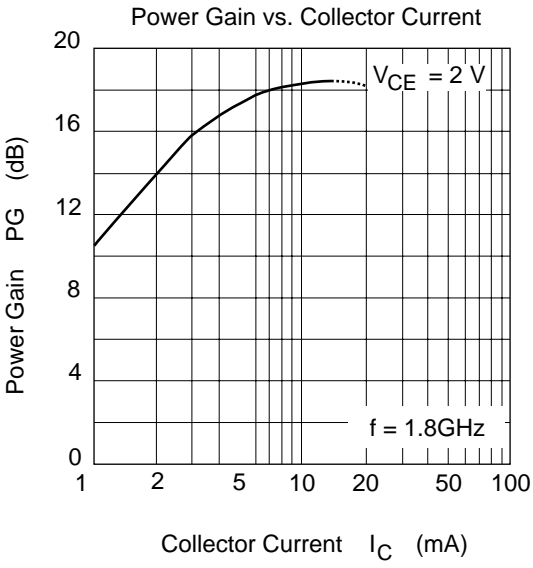
Item	Symbol	Rated	Unit
Collector to base voltage	$V_{CBO}$	10	V
Collector to emitter voltage	$V_{CEO}$	3.5	V
Emitter to base voltage	$V_{EBO}$	1	V
Collector current	$I_C$	12	mA
Collector power dissipation	Pc	50	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

## Electrical Characteristics (Ta = 25°C)

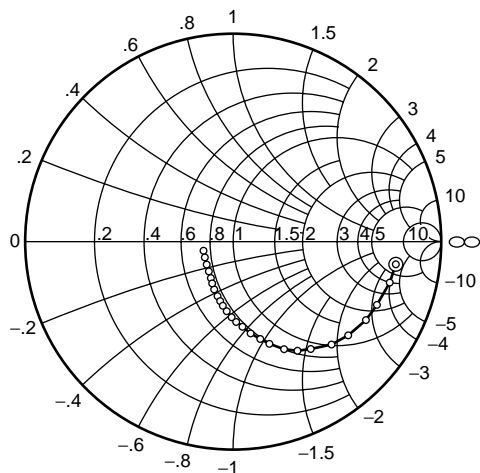
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	10	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu A$	$V_{CB} = 8 V, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	$\mu A$	$V_{CE} = 3 V, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 1 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	60	100	140	V	$V_{CE} = 2 V, I_C = 10 mA$
Collector output capacitance	Cob	—	0.15	0.4	pF	$V_{CB} = 2 V, I_E = 0$ $f = 1 MHz$
Gain bandwidth product	$f_T$	23	26	—	GHz	$V_{CE} = 2 V, I_C = 10 mA$ $f = 2 GHz$
Power gain	PG	14	18	—	dB	$V_{CE} = 2 V, I_C = 10 mA$ $f = 1.8 GHz$
Noise figure	NF	—	1.8	2.3	dB	$V_{CE} = 2 V, I_C = 3 mA$ $f = 1.8 GHz$

## Main Characteristics





S11 Parameter vs. Frequency

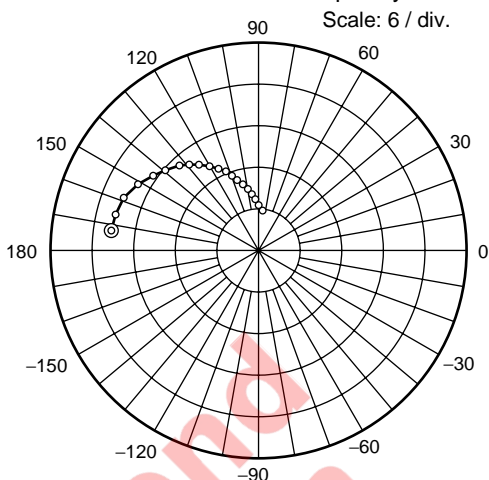


Condition :  $V_{CE} = 2\text{ V}$  ,  $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S21 Paramter vs. Frequency

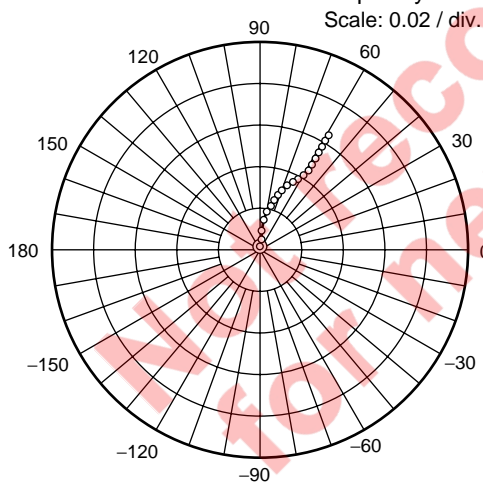


Condition :  $V_{CE} = 2\text{ V}$  ,  $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

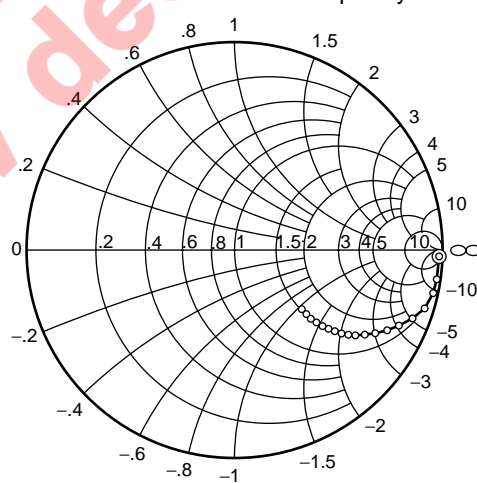


Condition :  $V_{CE} = 2\text{ V}$  ,  $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition :  $V_{CE} = 2\text{ V}$  ,  $I_C = 10\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

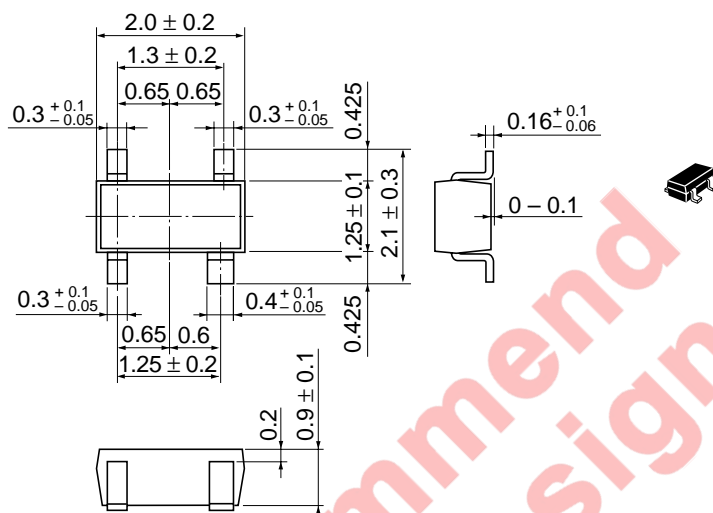
Sparameter (  $V_{CE} = 2\text{ V}$ ,  $I_C = 10\text{ mA}$ ,  $Z_o = 50\ \Omega$  )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.779	-6.9	21.32	173.3	0.0028	95.3	0.971	-3.6
200	0.773	-14.5	20.95	166.2	0.0064	92.6	0.971	-7.5
300	0.763	-22.9	20.35	158.9	0.0102	91.8	0.961	-12.1
400	0.741	-31.4	19.65	151.7	0.0142	87.0	0.941	-16.7
500	0.714	-38.7	18.72	145.2	0.0183	83.4	0.911	-20.8
600	0.679	-46.2	17.65	139.3	0.0222	79.7	0.876	-24.7
700	0.641	-53.6	16.61	133.9	0.0255	75.6	0.836	-27.9
800	0.601	-59.7	15.54	129.3	0.0286	72.7	0.795	-30.8
900	0.563	-65.6	14.54	124.4	0.0313	69.5	0.756	-33.1
1000	0.523	-70.7	13.62	120.5	0.0335	67.8	0.720	-34.9
1100	0.488	-75.0	12.78	117.1	0.0356	66.0	0.687	-36.5
1200	0.458	-80.1	12.05	114.1	0.0376	64.1	0.657	-37.5
1300	0.427	-83.8	11.36	111.0	0.0393	62.8	0.628	-38.4
1400	0.400	-88.9	10.64	108.5	0.0410	62.4	0.607	-38.9
1500	0.374	-91.9	10.15	106.0	0.0426	61.0	0.582	-39.6
1600	0.350	-96.1	9.59	104.0	0.0441	61.1	0.567	-39.8
1700	0.326	-100.1	9.14	101.7	0.0455	60.4	0.548	-40.2
1800	0.304	-102.9	8.68	100.1	0.0469	59.7	0.533	-40.2
1900	0.282	-107.0	8.29	98.1	0.0486	59.1	0.521	-40.5
2000	0.267	-110.8	7.93	96.1	0.0500	59.2	0.508	-40.5
2100	0.253	-115.2	7.62	94.4	0.0517	59.3	0.498	-40.5
2200	0.234	-118.7	7.30	92.6	0.0527	59.2	0.489	-40.7
2300	0.225	-122.1	7.03	91.0	0.0543	58.6	0.481	-40.6
2400	0.212	-127.9	6.76	89.6	0.0557	58.4	0.473	-40.7
2500	0.199	-131.8	6.54	88.8	0.0573	58.2	0.468	-40.5
2600	0.193	-135.2	6.31	86.8	0.0579	58.3	0.461	-40.7
2700	0.186	-141.9	6.11	85.4	0.0600	58.2	0.456	-40.4
2800	0.178	-146.0	5.89	84.2	0.0612	58.2	0.450	-40.6
2900	0.177	-151.4	5.73	82.7	0.0624	58.3	0.447	-40.5
3000	0.168	-157.0	5.56	81.4	0.0642	57.8	0.442	-40.9



## Package Dimensions

Unit: mm



Hitachi Code	CMPAK-4(T)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.006 g

Not recommended  
for new design

## Cautions

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