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

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2SC5812

Silicon NPN Epitaxial
VHF/UHF wide band amplifier

RENESAS

ADE-208-1468(Z)

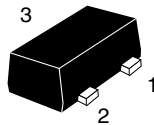
Rev.0
Nov. 2001

Features

- High power gain, Low noise figure at low power operation:
 $|S_{21}|^2 = 17 \text{ dB typ}$, $NF = 1.0 \text{ dB typ}$ ($V_{CE} = 1 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 900 \text{ MHz}$)

Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WG-".

Absolute Maximum Ratings

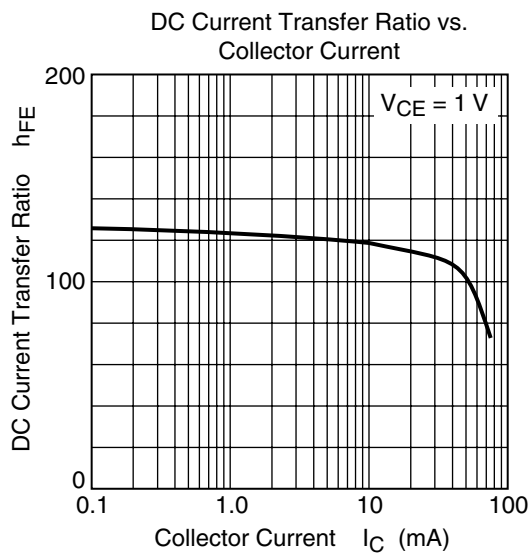
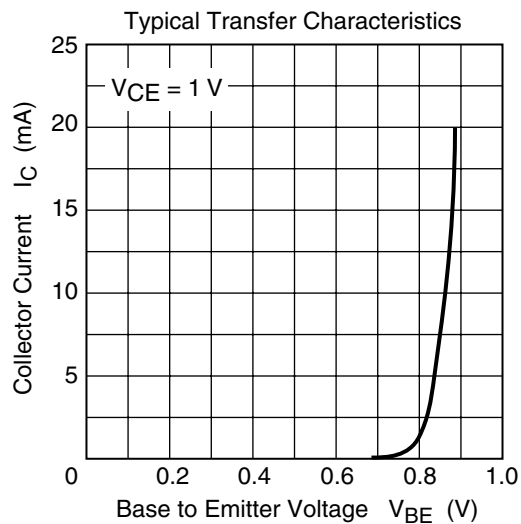
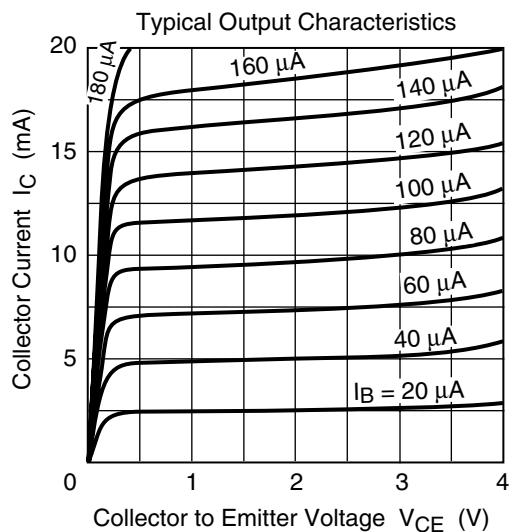
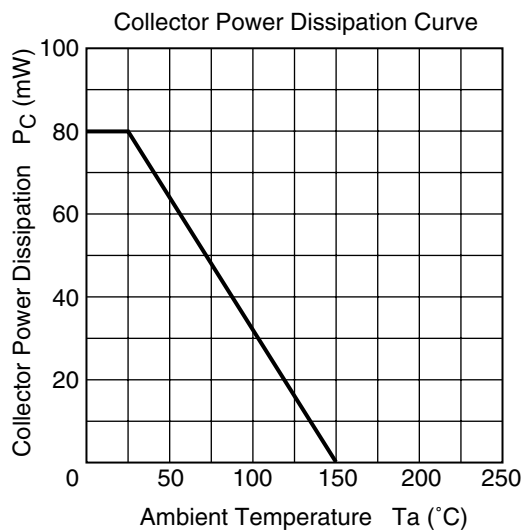
(Ta = 25°C)

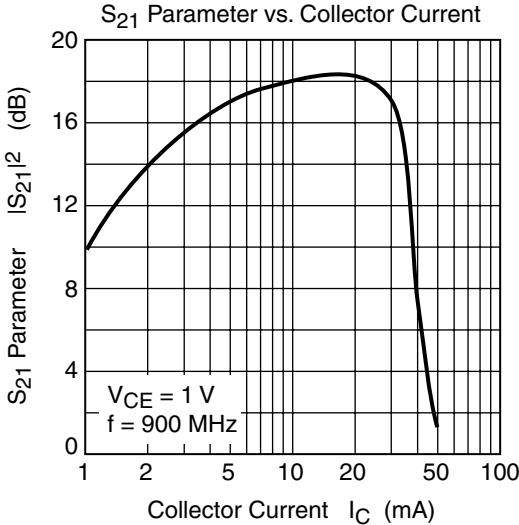
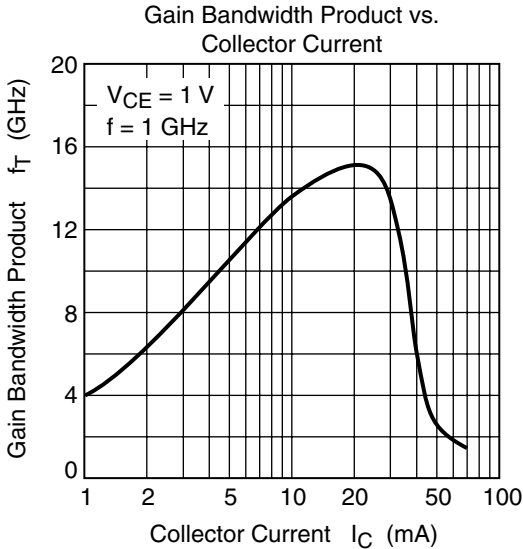
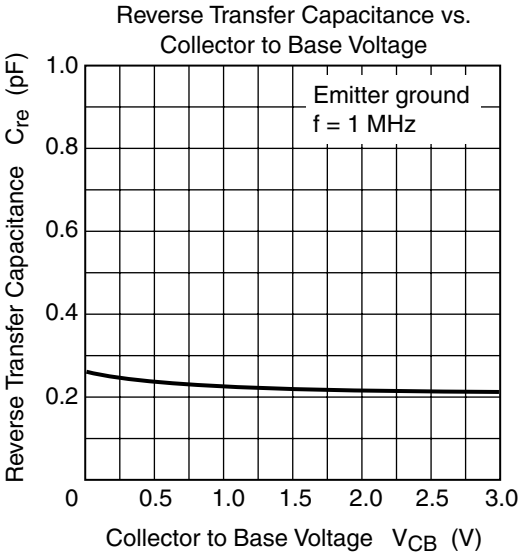
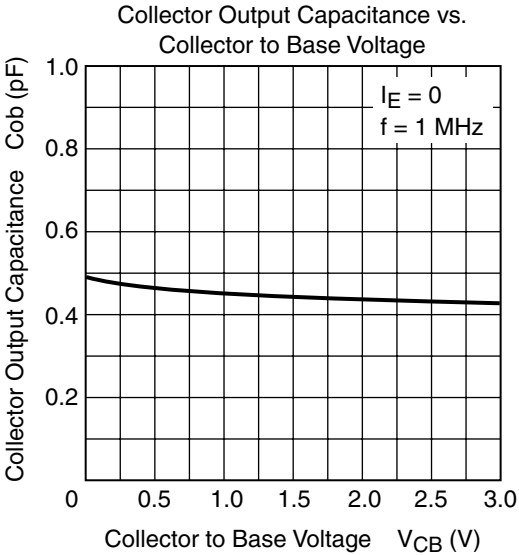
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	4	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	80	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

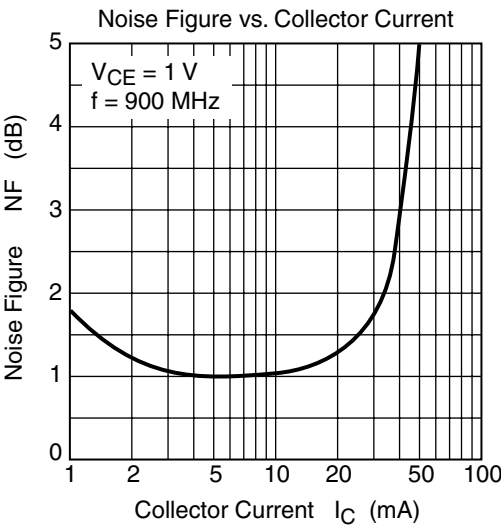
Electrical Characteristics

(Ta = 25°C)

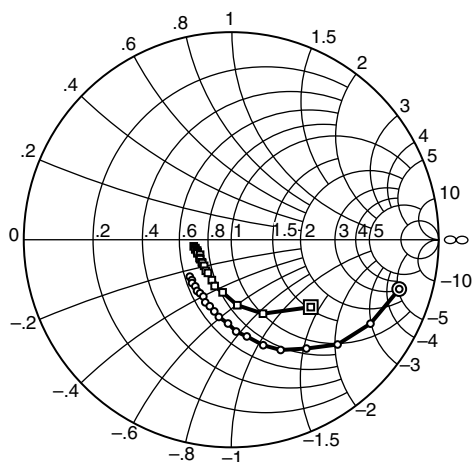
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A$, $I_E = 0$
Collector cutoff current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 15 V$, $I_E = 0$
Collector cutoff current	I_{CEO}	—	—	1	μA	$V_{CE} = 4 V$, $R_{BE} = \text{Infinite}$
Emitter cutoff current	I_{EBO}	—	—	0.1	μA	$V_{EB} = 0.8 V$, $I_C = 0$
DC current transfer ratio	h_{FE}	100	120	150	—	$V_{CE} = 1 V$, $I_C = 5 mA$
Reverse transfer capacitance	C_{re}	—	0.2	—	pF	$V_{CE} = 1 V$, Emitter ground, $f = 1 MHz$
Collector output capacitance	C_{ob}	—	0.4	0.7	pF	$V_{CB} = 1 V$, $I_E = 0$, $f = 1 MHz$
Gain bandwidth product	$f_T(1)$	8	11	—	GHz	$V_{CE} = 1 V$, $I_C = 5 mA$
Gain bandwidth product	$f_T(2)$	—	15	—	GHz	$V_{CE} = 1 V$, $I_C = 20 mA$
Forward transmission coefficient	$ S_{21} ^2$	14	17	—	dB	$V_{CE} = 1 V$, $I_C = 5 mA$, $f = 900 MHz$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1 V$, $I_C = 5 mA$, $f = 900 MHz$, $\Gamma_S = \Gamma_L = 50 \Omega$







S_{11} Parameter vs. Frequency

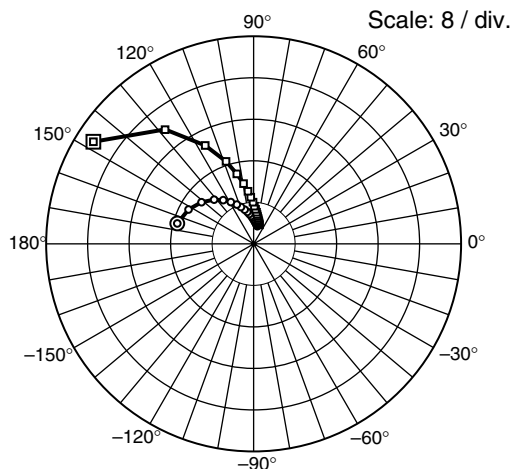


Test conditions: $V_{CE} = 1$ V , $Z_O = 50$ Ω
100 to 2000 MHz (100 MHz step)

⊙—○ ($I_C = 5$ mA)

⊠—□ ($I_C = 20$ mA)

S_{21} Parameter vs. Frequency



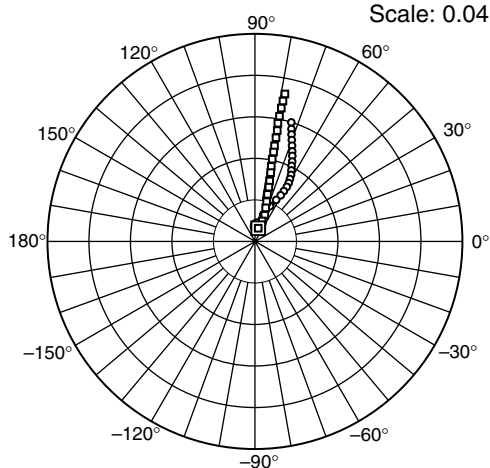
Test conditions: $V_{CE} = 1$ V , $Z_O = 50$ Ω
100 to 2000 MHz (100 MHz step)

⊙—○ ($I_C = 5$ mA)

⊠—□ ($I_C = 20$ mA)

S_{12} Parameter vs. Frequency

Scale: 0.04 / div.

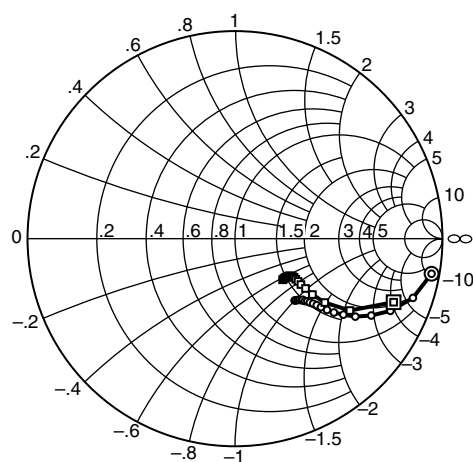


Test conditions: $V_{CE} = 1$ V , $Z_O = 50$ Ω
100 to 2000 MHz (100 MHz step)

⊙—○ ($I_C = 5$ mA)

⊠—□ ($I_C = 20$ mA)

S_{22} Parameter vs. Frequency



Test conditions: $V_{CE} = 1$ V , $Z_O = 50$ Ω
100 to 2000 MHz (100 MHz step)

⊙—○ ($I_C = 5$ mA)

⊠—□ ($I_C = 20$ mA)

S Parameter(V_{CE} = 1 V, I_C = 5 mA, Z_o = 50 Ω)

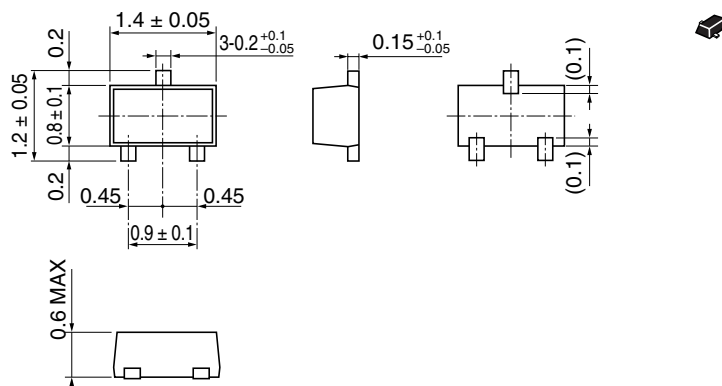
f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.842	-16.3	15.23	164.9	0.015	80.2	0.963	-10.1
200	0.783	-31.7	14.17	152.2	0.027	72.9	0.904	-18.4
300	0.719	-44.6	12.84	141.4	0.037	66.8	0.826	-24.9
400	0.637	-55.4	11.41	131.8	0.045	62.9	0.754	-29.4
500	0.582	-65.9	10.25	124.8	0.051	60.8	0.691	-32.9
600	0.531	-73.2	9.16	118.6	0.056	60.1	0.638	-35.0
700	0.472	-80.9	8.22	113.1	0.061	59.7	0.595	-36.7
800	0.443	-87.0	7.49	108.9	0.065	60.0	0.561	-37.7
900	0.404	-92.3	6.80	104.6	0.069	60.7	0.530	-38.5
1000	0.377	-99.2	6.26	101.0	0.073	61.5	0.508	-39.1
1100	0.355	-103.4	5.80	98.1	0.077	62.8	0.490	-39.7
1200	0.337	-108.0	5.38	94.8	0.081	64.1	0.474	-40.4
1300	0.327	-112.6	5.04	92.4	0.085	65.0	0.461	-40.8
1400	0.305	-116.3	4.71	90.1	0.090	66.4	0.452	-41.7
1500	0.299	-120.3	4.45	87.7	0.094	67.5	0.440	-42.0
1600	0.297	-123.8	4.20	86.0	0.099	68.5	0.437	-42.8
1700	0.284	-127.7	3.98	83.6	0.104	70.0	0.428	-43.4
1800	0.282	-132.2	3.80	81.7	0.109	71.1	0.423	-44.3
1900	0.272	-134.3	3.62	79.8	0.114	72.0	0.418	-45.3
2000	0.268	-138.4	3.47	77.9	0.120	73.0	0.414	-46.0

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.502	−40.3	36.64	147.5	0.013	76.3	0.824	−21.8
200	0.388	−66.7	27.85	127.8	0.021	70.3	0.653	−32.0
300	0.317	−84.6	21.13	116.2	0.027	69.3	0.531	−35.4
400	0.257	−99.2	16.75	108.5	0.034	72.2	0.460	−35.8
500	0.237	−109.6	13.87	103.5	0.040	73.6	0.416	−35.2
600	0.216	−115.5	11.77	99.5	0.047	75.0	0.387	−34.8
700	0.195	−125.0	10.19	96.1	0.054	75.6	0.367	−34.1
800	0.193	−129.2	9.00	93.5	0.060	76.3	0.352	−33.7
900	0.181	−135.9	8.03	90.8	0.068	77.1	0.340	−33.2
1000	0.179	−141.0	7.26	88.8	0.074	77.7	0.333	−33.3
1100	0.178	−142.4	6.66	86.8	0.081	78.1	0.326	−33.7
1200	0.176	−147.8	6.12	84.7	0.088	78.2	0.321	−34.0
1300	0.176	−150.0	5.68	83.2	0.094	78.4	0.317	−34.5
1400	0.166	−154.2	5.32	81.7	0.102	78.5	0.314	−35.1
1500	0.175	−158.0	4.97	80.0	0.109	78.6	0.311	−36.0
1600	0.172	−159.7	4.70	78.7	0.116	79.0	0.309	−36.8
1700	0.172	−162.4	4.43	77.0	0.123	78.9	0.307	−37.6
1800	0.179	−164.9	4.21	75.7	0.131	78.8	0.305	−38.6
1900	0.177	−166.8	4.01	74.3	0.138	78.7	0.304	−39.7
2000	0.183	−169.9	3.83	72.8	0.145	78.5	0.303	−40.8

Package Dimensions

As of July, 2001
Unit: mm



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

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