

To all our customers

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Customer Support Dept.  
April 1, 2003

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# 2SC5628

## Silicon NPN Epitaxial High Frequency Amplifier / Oscillator

# RENESAS

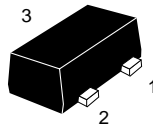
ADE-208-979A (Z)  
2nd. Edition  
April 2001

### Features

- Super compact package;  
(1.4 × 0.8 × 0.59mm)
- High power gain and low noise figure;  
(PG = 9 dB, NF = 1.1 dB typ, at f = 900 Mhz, V<sub>CE</sub> = 1 V)

### Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "XZ-".

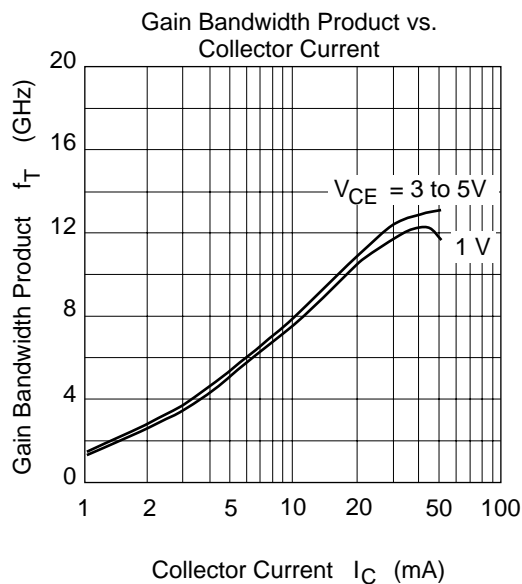
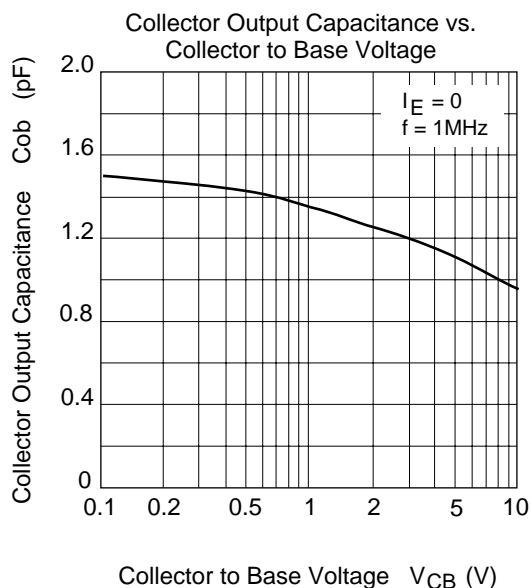
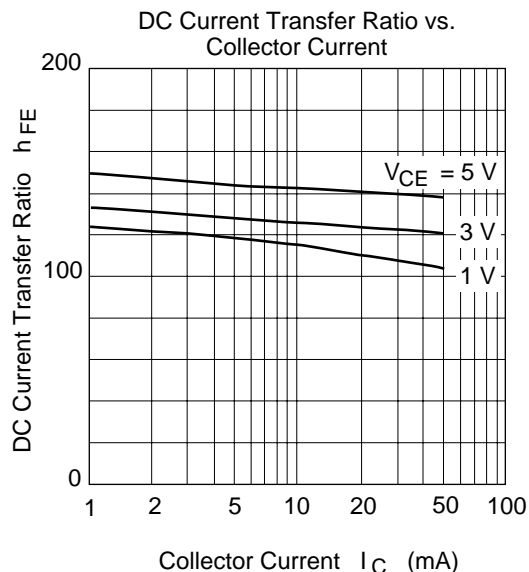
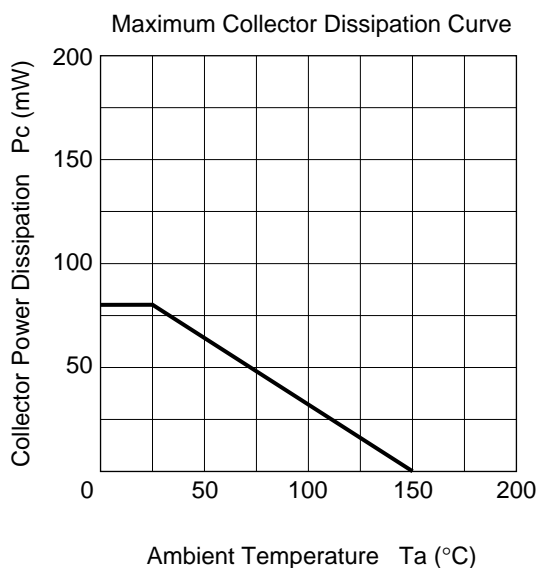
## Absolute Maximum Ratings (Ta = 25°C)

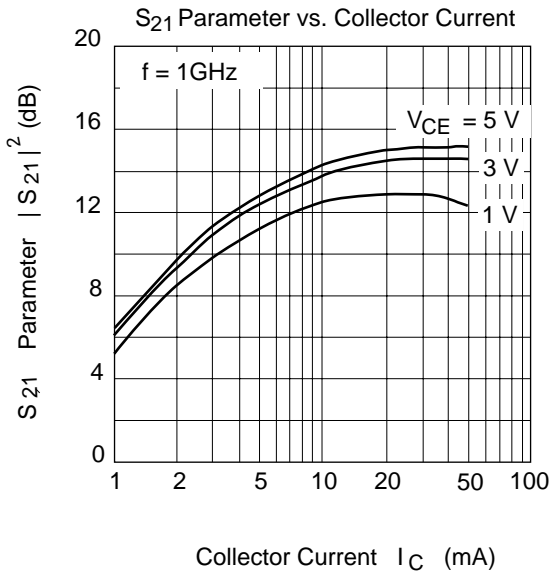
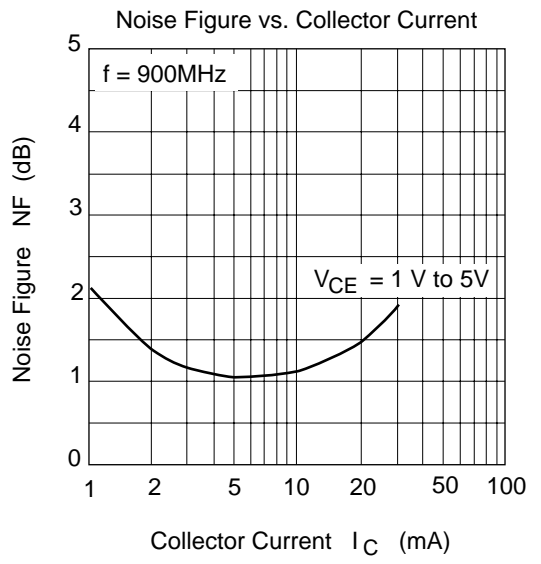
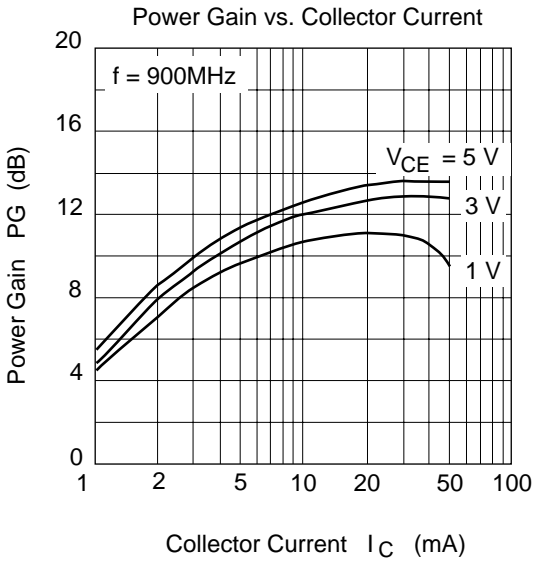
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	8	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	50	mA
Collector power dissipation	Pc	80	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

## Electrical Characteristics (Ta = 25°C)

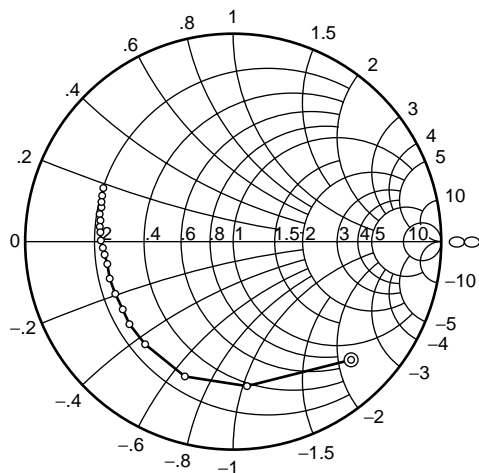
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10\mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu A$	$V_{CB} = 12V, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	mA	$V_{CE} = 8V, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 1.5V, I_C = 0$
DC current transfer ratio	$h_{FE}$	50	100	160	V	$V_{CE} = 1V, I_C = 5mA$
Collector output capacitance	Cob	—	0.55	0.85	pF	$V_{CB} = 1V, I_E = 0$ $f = 1MHz$
Gain bandwidth product	$f_T$	6	9	—	GHz	$V_{CE} = 1V, I_C = 5mA$
Power gain	PG	11	14	—	dB	$V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$
Noise figure	NF	—	1.1	2.0	dB	$V_{CE} = 1V, I_C = 5mA$ $f = 900MHz$

Main Characteristics





S11 Parameter vs. Frequency

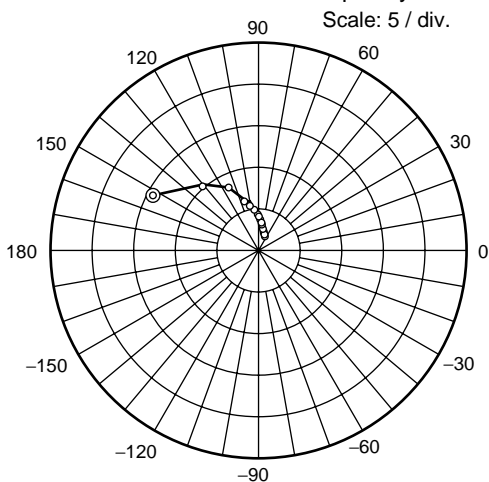


Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

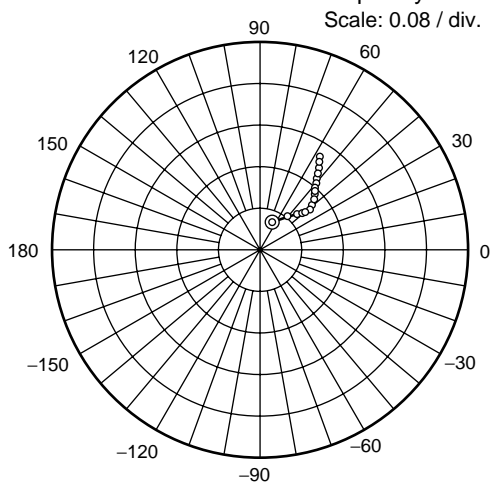


Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

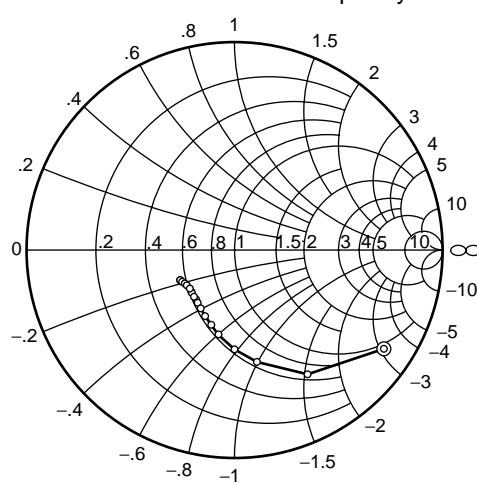


Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency

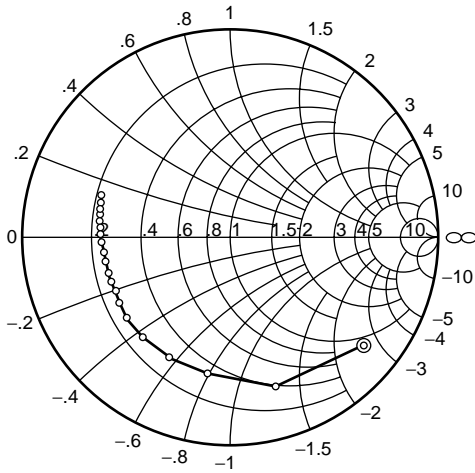


Condition :  $V_{CE} = 1\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S11 Parameter vs. Frequency

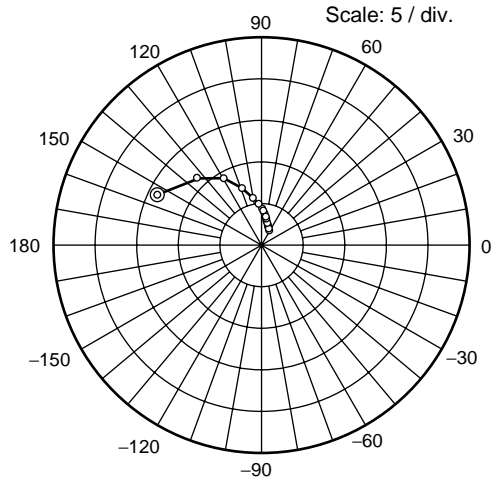


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

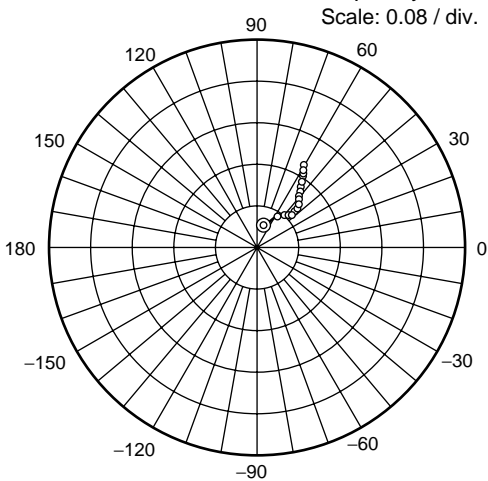


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

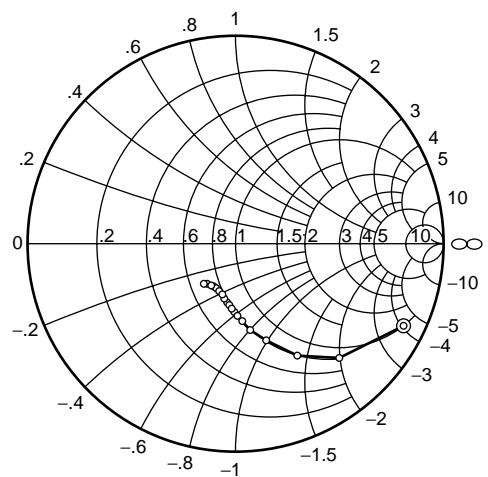


Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition :  $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○



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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.815	-46.1	13.63	152.2	0.0509	67.0	0.882	-32.5
200	0.734	-84.6	10.68	130.6	0.0834	51.0	0.695	-58.5
300	0.692	-111.2	8.23	116.8	0.0998	42.9	0.550	-76.0
400	0.665	-127.4	6.58	107.9	0.108	39.5	0.459	-88.5
500	0.650	-139.6	5.44	101.4	0.114	38.0	0.399	-98.1
600	0.644	-148.8	4.61	96.3	0.120	38.3	0.360	-105.7
700	0.640	-155.6	4.03	92.2	0.124	39.0	0.333	-112.2
800	0.641	-161.6	3.56	88.6	0.128	39.9	0.315	-117.8
900	0.638	-166.9	3.20	85.3	0.134	41.8	0.301	-122.4
1000	0.638	-171.6	2.90	82.2	0.138	43.5	0.292	-126.7
1100	0.643	-175.1	2.66	79.6	0.143	44.4	0.286	-130.2
1200	0.643	-178.5	2.46	77.2	0.149	46.2	0.280	-133.6
1300	0.648	178.5	2.28	74.9	0.154	47.8	0.279	-135.6
1400	0.651	175.4	2.15	72.8	0.161	49.1	0.278	-138.6
1500	0.658	173.2	2.03	70.5	0.168	50.9	0.277	-140.9
1600	0.663	170.0	1.92	68.5	0.174	51.8	0.279	-143.3
1700	0.667	167.2	1.82	66.7	0.182	53.2	0.281	-145.0
1800	0.669	165.0	1.74	64.4	0.189	54.6	0.282	-147.1
1900	0.673	163.1	1.67	63.2	0.196	55.5	0.286	-149.3
2000	0.682	161.0	1.60	61.4	0.204	56.4	0.289	-150.6

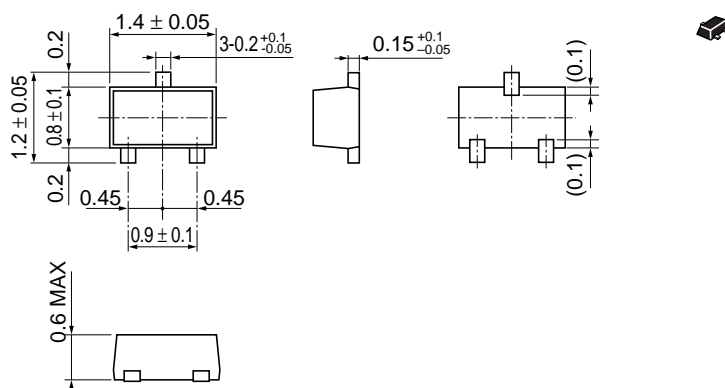
## 2SC5628

Sparameter ( $V_{CE} = 3\text{ V}$ ,  $I_C = 5\text{ mA}$ ,  $Z_0 = 50\ \Omega$ )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.826	-39.3	14.04	155.5	0.0412	69.9	0.906	-25.8
200	0.746	-74.6	11.47	134.9	0.0700	54.9	0.738	-47.3
300	0.685	-100.5	9.14	121.1	0.0864	46.7	0.591	-61.9
400	0.646	-117.4	7.41	111.9	0.0950	43.0	0.490	-71.9
500	0.627	-130.7	6.19	104.8	0.101	41.3	0.419	-79.9
600	0.617	-141.0	5.27	99.6	0.107	41.3	0.369	-85.7
700	0.606	-149.0	4.61	95.0	0.111	41.6	0.333	-90.7
800	0.598	-155.4	4.09	91.6	0.115	42.5	0.307	-95.3
900	0.605	-161.3	3.67	87.7	0.120	44.3	0.287	-99.0
1000	0.604	-166.1	3.35	84.7	0.124	45.6	0.273	-102.6
1100	0.604	-170.6	3.06	81.8	0.129	46.8	0.262	-106.0
1200	0.607	-174.2	2.83	79.5	0.134	49.0	0.253	-108.8
1300	0.605	-178.2	2.62	77.1	0.139	50.4	0.249	-111.0
1400	0.608	178.9	2.47	74.9	0.145	51.9	0.245	-114.3
1500	0.618	175.5	2.32	72.7	0.152	53.4	0.242	-116.6
1600	0.622	172.4	2.19	70.7	0.157	54.8	0.241	-118.9
1700	0.627	170.0	2.08	68.9	0.164	56.2	0.241	-121.3
1800	0.629	166.9	1.99	66.7	0.171	57.6	0.242	-123.4
1900	0.633	164.3	1.90	65.2	0.177	58.7	0.243	-125.9
2000	0.641	162.3	1.82	63.4	0.186	59.5	0.245	-127.7

## Package Dimensions

Unit: mm



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

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Colophon 4.0

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