

# 2SC5624

## Silicon NPN Epitaxial High Frequency Low Noise Amplifier

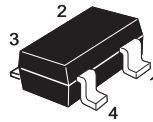
REJ03G0129-0300  
Rev.3.00  
Feb.21.2005

### Features

- High gain bandwidth product  
 $f_T = 28 \text{ GHz typ.}$
- High power gain and low noise figure;  
 $PG = 18 \text{ dB typ.}, NF = 1.2 \text{ dB typ. at } f = 1.8 \text{ GHz}$

### Outline

RENESAS Package code: PTSP0004ZA-A  
(Package name: CMPAK-4)



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

Note: Marking is "VH-".

### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	10	V
Collector to emitter voltage	$V_{CEO}$	3.5	V
Emitter to base voltage	$V_{EBO}$	0.8	V
Collector current	$I_C$	35	mA
Collector power dissipation	$P_C$	100	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

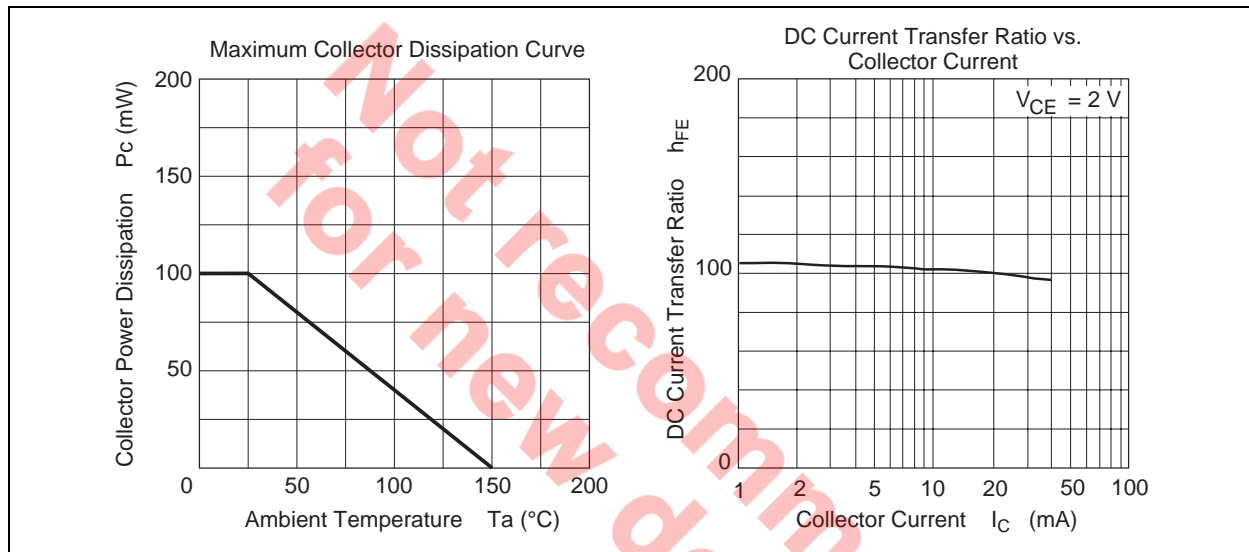
Note: Value on PCB (40 x 40 x 1.0mm)

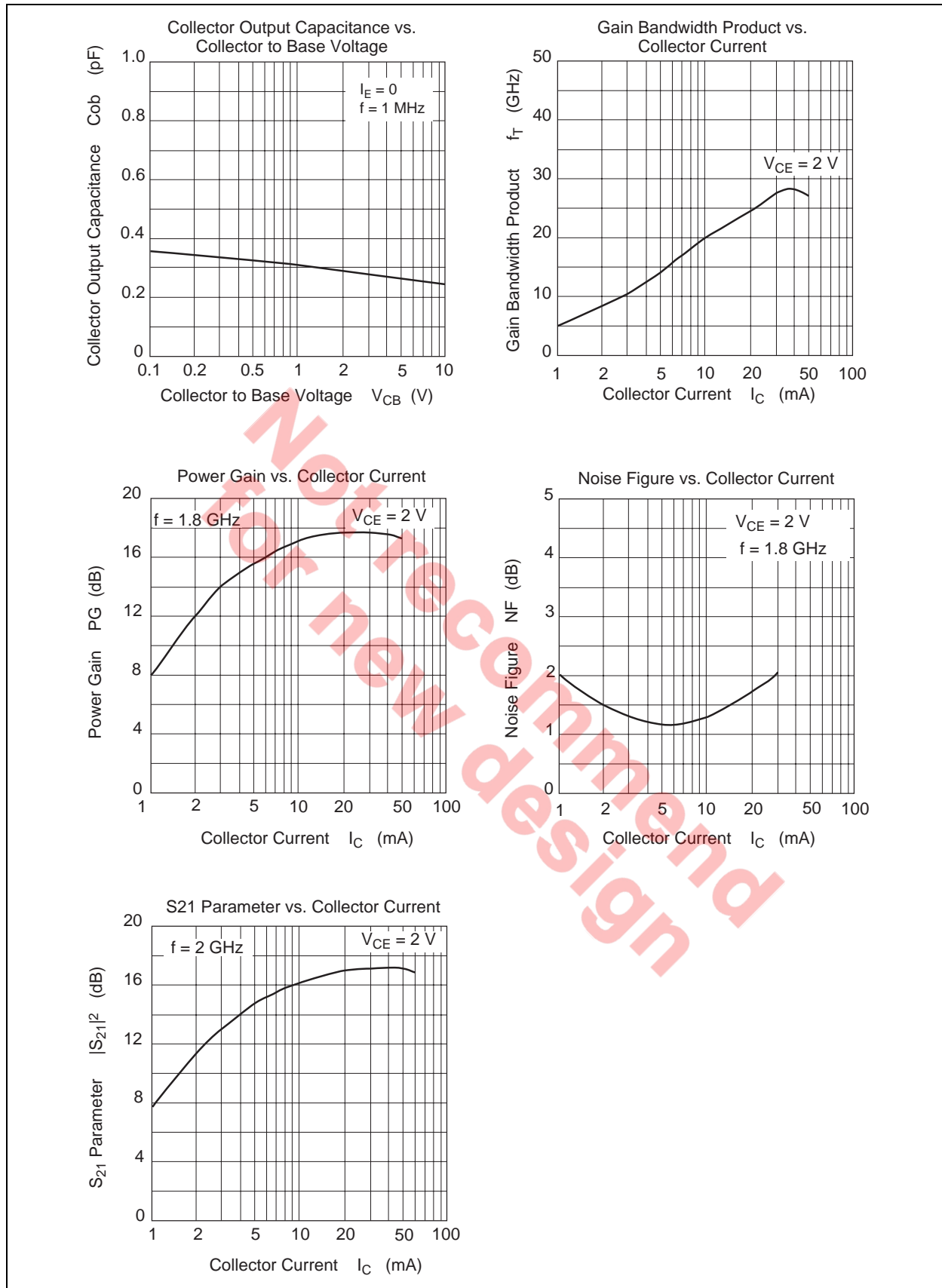
## Electrical Characteristics

(Ta = 25°C)

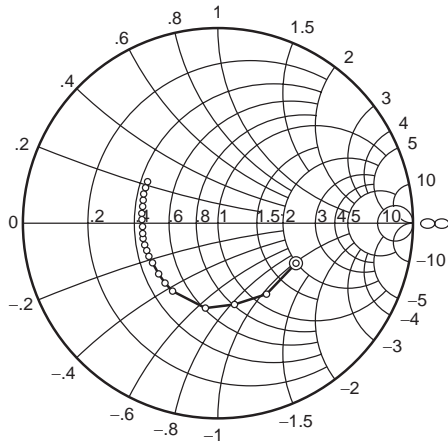
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu\text{A}$	$V_{CB} = 8\text{ V}, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	$\mu\text{A}$	$V_{CE} = 3\text{ V}, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu\text{A}$	$V_{EB} = 0.8\text{ V}, I_C = 0$
DC current transfer ratio	$h_{FE}$	80	120	160		$V_{CE} = 2\text{ V}, I_C = 20\text{ mA}$
Collector output capacitance	$C_{ob}$	—	0.3	0.6	pF	$V_{CB} = 2\text{ V}, I_E = 0, f = 1\text{ MHz}$
Gain bandwidth product	$f_T$	25	28	—	GHz	$V_{CE} = 2\text{ V}, I_C = 30\text{ mA}, f = 2\text{ GHz}$
Power gain	PG	14	18	—	dB	$V_{CE} = 2\text{ V}, I_C = 30\text{ mA}, f = 1.8\text{ GHz}$
Noise figure	NF	—	1.2	1.6	dB	$V_{CE} = 2\text{ V}, I_C = 5\text{ mA}, f = 1.8\text{ GHz}$

## Main Characteristics





S11 Parameter vs. Frequency

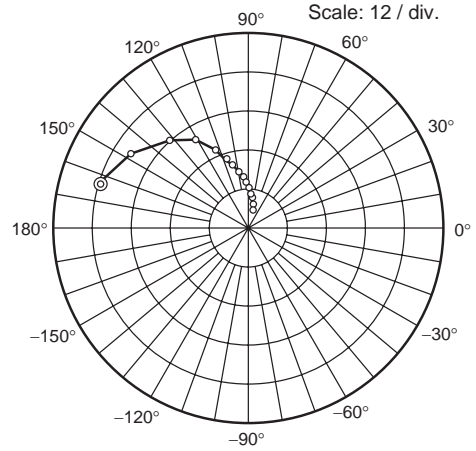


Condition ;  $V_{CE} = 2\text{ V}$ ,  $I_C = 30\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S21 Parameter vs. Frequency

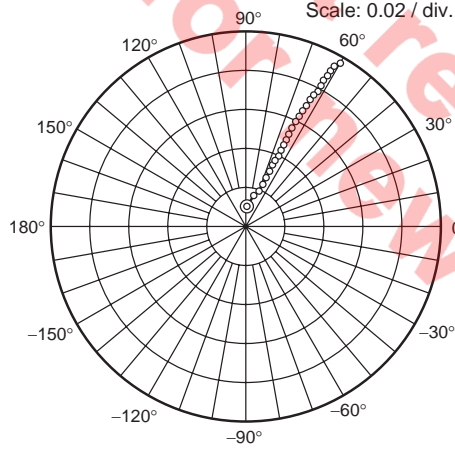


Condition ;  $V_{CE} = 2\text{ V}$ ,  $I_C = 30\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

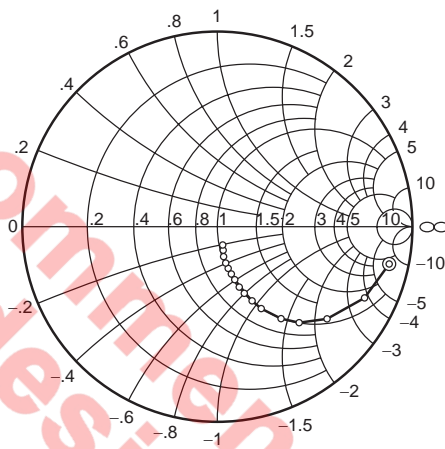


Condition ;  $V_{CE} = 2\text{ V}$ ,  $I_C = 30\text{ mA}$

100 to 3000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



Condition ;  $V_{CE} = 2\text{ V}$ ,  $I_C = 30\text{ mA}$

100 to 3000 MHz (100 MHz step)

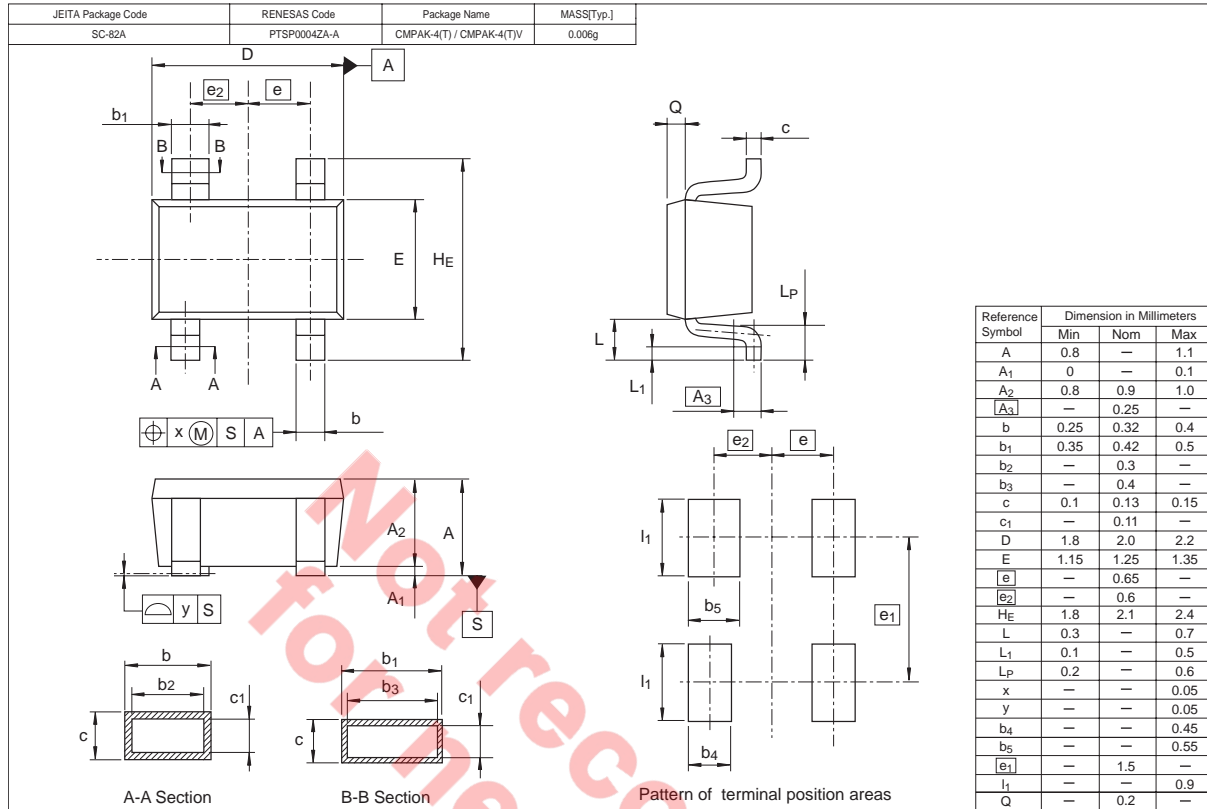
⊙—○

## S Parameter

 $(V_{CE} = 2 \text{ V}, I_C = 30 \text{ mA}, Z_o = 50 \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.445	-27.3	46.66	163.5	0.0055	83.8	0.904	-12.9
200	0.447	-54.4	42.27	147.1	0.0115	78.6	0.846	-26.8
300	0.439	-78.7	36.16	133.0	0.0165	73.6	0.750	-39.3
400	0.432	-98.8	30.59	122.2	0.0207	68.8	0.650	-48.8
500	0.424	-112.8	25.84	114.5	0.0246	67.1	0.561	-55.9
600	0.414	-124.3	22.15	108.9	0.0277	66.1	0.487	-61.4
700	0.407	-133.4	19.22	104.4	0.0307	65.0	0.426	-65.3
800	0.398	-141.5	16.94	100.8	0.0335	65.3	0.376	-68.6
900	0.390	-147.9	15.05	97.7	0.0372	64.4	0.335	-70.7
1000	0.386	-154.1	13.63	95.3	0.0398	65.1	0.301	-72.5
1100	0.381	-159.0	12.45	93.3	0.0420	65.2	0.273	-73.7
1200	0.377	-164.0	11.48	91.3	0.0452	65.0	0.250	-74.5
1300	0.371	-167.8	10.60	89.6	0.0480	64.5	0.229	-74.9
1400	0.370	-171.8	9.84	87.7	0.0509	64.7	0.213	-75.1
1500	0.367	-175.7	9.23	86.1	0.0535	64.3	0.197	-75.2
1600	0.368	-178.8	8.66	84.7	0.0567	64.1	0.186	-74.7
1700	0.370	178.0	8.16	83.4	0.0595	64.4	0.173	-74.7
1800	0.360	174.7	7.72	82.2	0.0623	64.3	0.164	-74.0
1900	0.365	172.0	7.33	80.8	0.0651	64.0	0.156	-73.6
2000	0.365	168.9	6.95	79.4	0.0682	63.8	0.148	-72.7
2100	0.362	166.8	6.66	78.2	0.0709	63.1	0.142	-72.0
2200	0.372	164.1	6.35	77.0	0.0737	63.0	0.135	-71.3
2300	0.370	160.9	6.08	75.6	0.0764	62.3	0.130	-70.8
2400	0.372	159.0	5.86	74.6	0.0795	62.3	0.125	-69.9
2500	0.378	156.6	5.64	73.5	0.0824	62.0	0.121	-68.7
2600	0.370	154.5	5.42	72.3	0.0848	61.6	0.117	-68.5
2700	0.382	152.2	5.24	71.3	0.0874	61.7	0.113	-67.1
2800	0.388	150.7	5.03	70.3	0.0906	60.7	0.109	-66.8
2900	0.387	147.6	4.86	69.0	0.0928	61.0	0.105	-65.7
3000	0.388	146.9	4.72	67.9	0.0964	59.7	0.102	-65.5

### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
2SC5624VH-TL-E	3000 pcs.	φ178 Reel, 8 mm Taping

Note: Therefore especially small contact area of terminal, miss contact may occur if inadequate soldering condition is applied.

Contact Renesas sales office for any question regarding recommended soldering condition of Renesas.

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