To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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2SC5080

Silicon NPN Epitaxial

REJ03G0742-0300
(Previous ADE-208-1132A)
Rev.3.00
Aug.10.2005

Application

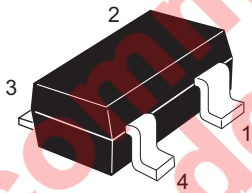
VHF / UHF wide band amplifier

Features

- High gain bandwidth product
  f_T = 13.5 GHz Typ
- High gain, low noise figure
  PG = 18 dB Typ, NF = 1.1 dB Typ at f = 900 MHz

Outline

RENESAS Package code: PLSP0004ZA-A
(Package name: MPAK-4)



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

Note: Marking is “ZD–”.

Attention: This device is very sensitive to electro static discharge.
It is recommended to adopt appropriate cautions when handling this transistor.

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	P_C	150	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

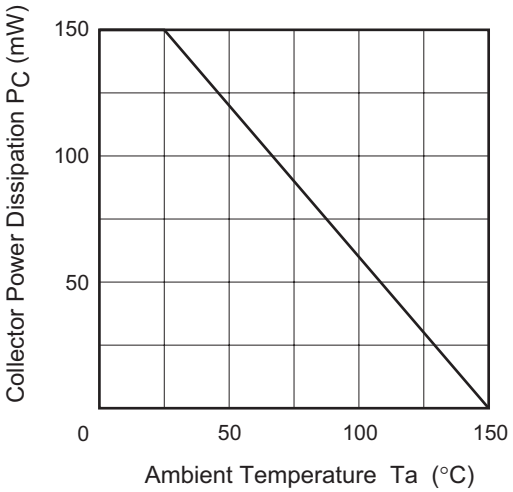
Electrical Characteristics

(Ta = 25°C)

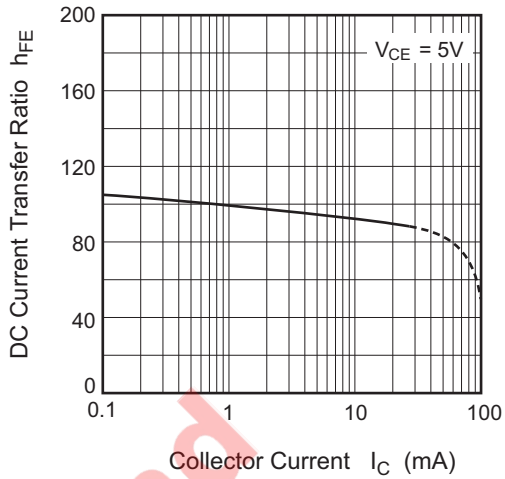
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10 µA, I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	µA	V_{CB} = 12 V, I_E = 0
	I_{CEO}	—	—	1	mA	V_{CE} = 8 V, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	V_{EB} = 1.5 V, I_C = 0
DC current transfer ratio	h_{FE}	50	90	160		V_{CE} = 5 V, I_C = 20 mA
Collector output capacitance	Cob	—	0.4	0.75	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	10.5	13.5	—	GHz	V_{CE} = 5 V, I_C = 20 mA
Power gain	PG	15	18	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	1.1	2.0	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

Main Characteristics

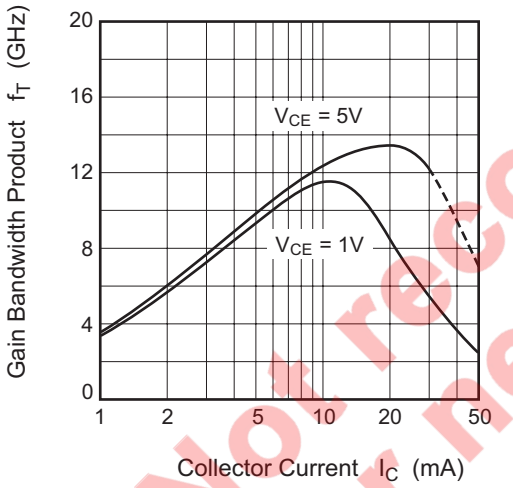
Maximum Collector Dissipation Curve



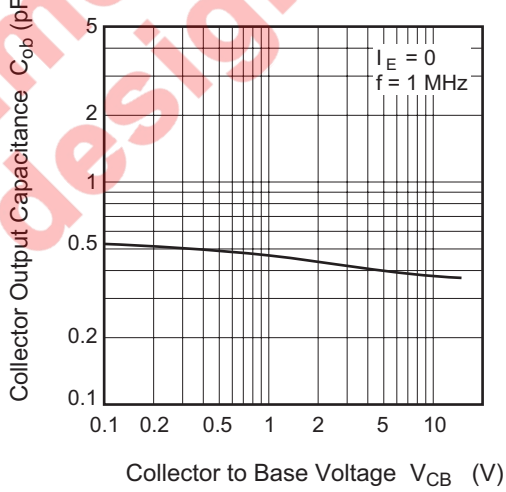
DC Current Transfer Ratio vs. Collector Current



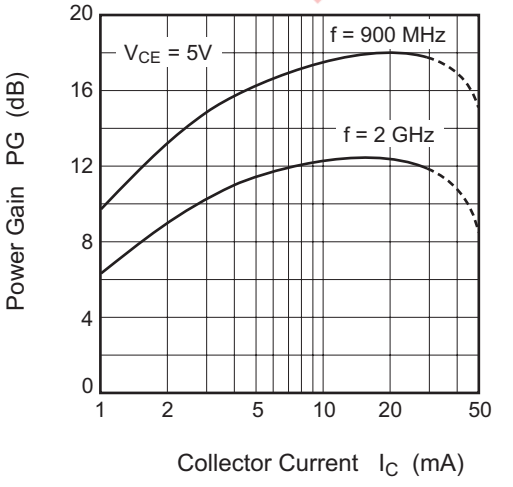
Gain Bandwidth Product vs. Collector Current



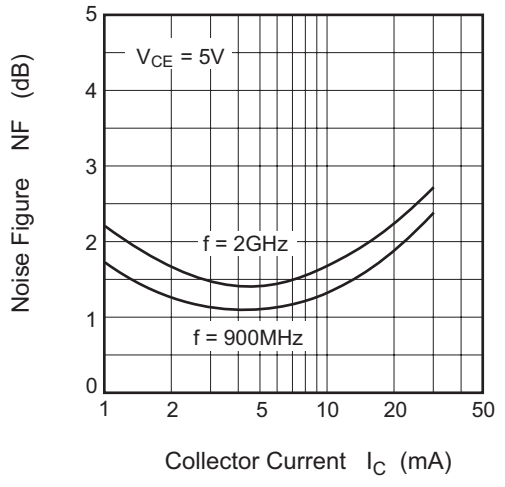
Collector Output Capacitance vs. Collector to Base Voltage

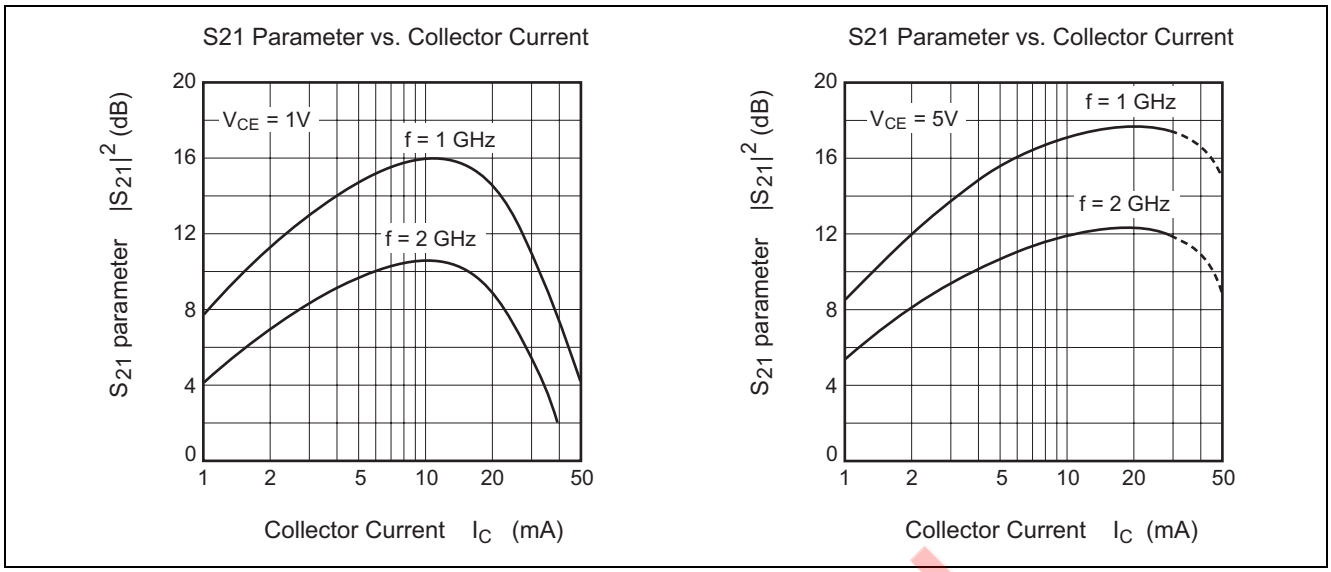


Power Gain vs. Collector Current

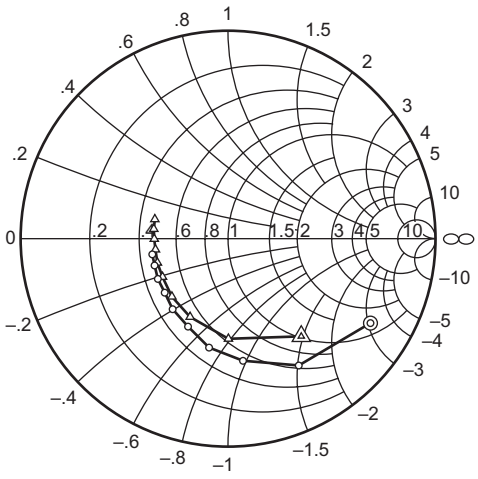


Noise Figure vs. Collector Current



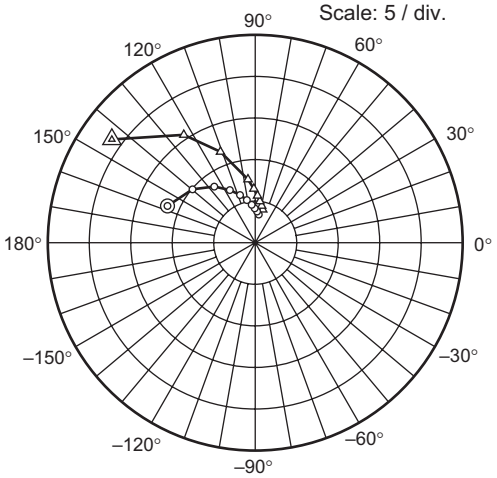


S11 Parameter vs. Frequency



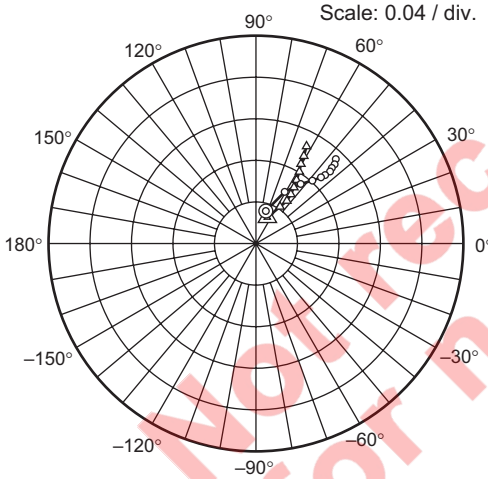
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S21 Parameter vs. Frequency



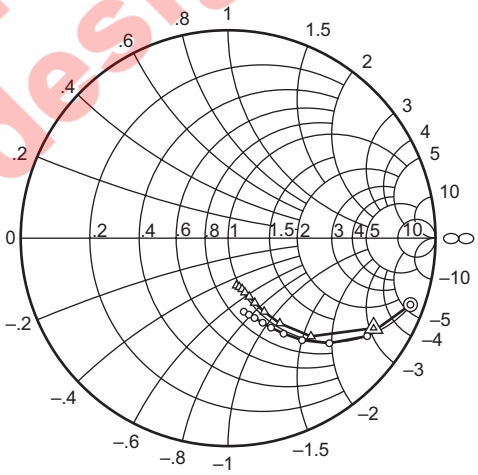
Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S12 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S22 Parameter vs. Frequency



Condition: V_{CE} = 5 V , Zo = 50 Ω
200 to 2000 MHz (200 MHz step)
(I_C = 5 mA)
(I_C = 20 mA)

S Parameters

(V_{CE} = 5 V, I_C = 5 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.798	–30.8	11.47	157.3	0.0329	73.0	0.936	–20.0
400	0.699	–60.8	9.88	139.6	0.0570	60.8	0.820	–35.1
600	0.592	–83.0	8.35	126.1	0.0718	53.0	0.703	–46.0
800	0.532	–99.9	7.03	115.7	0.0817	48.0	0.607	–54.0
1000	0.465	–114.5	6.02	107.6	0.0891	45.4	0.532	–59.8
1200	0.432	–128.2	5.23	101.0	0.0939	44.6	0.478	–64.3
1400	0.401	–139.6	4.58	95.2	0.0993	44.1	0.440	–67.7
1600	0.390	–150.2	4.14	90.7	0.103	44.8	0.405	–71.6
1800	0.373	–160.5	3.76	86.4	0.108	45.1	0.382	–74.7
2000	0.373	–168.3	3.42	82.6	0.112	46.5	0.362	–77.9

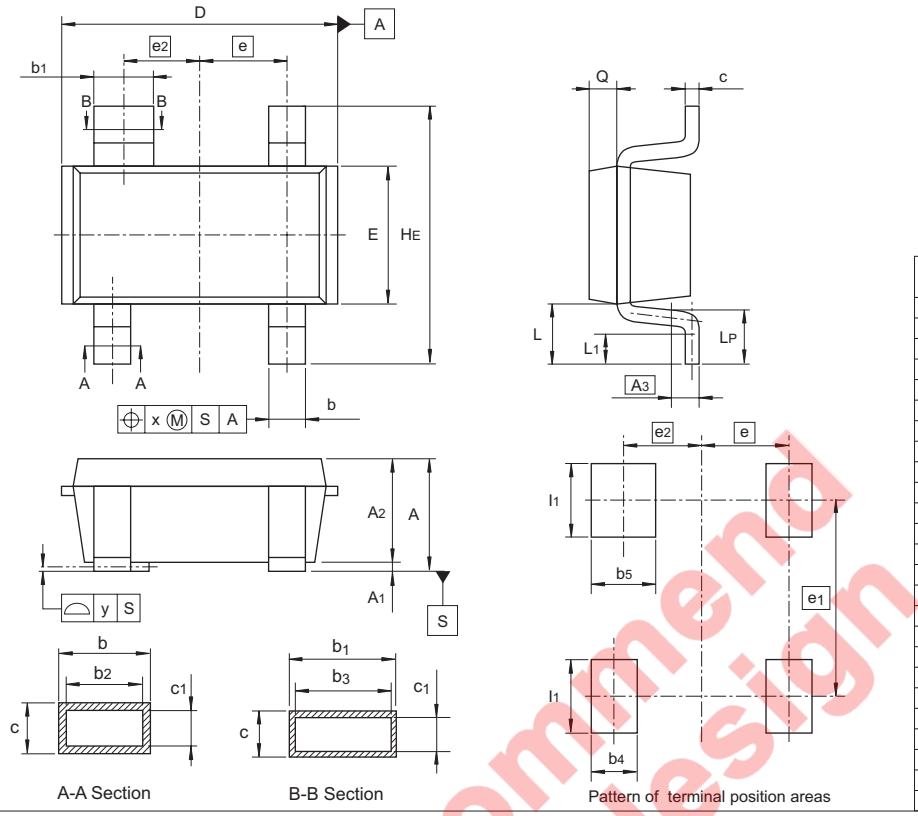
S Parameters

(V_{CE} = 5 V, I_C = 20 mA, Z_O = 50 Ω)

Freq.	S11		S21		S12		S22	
(MHz)	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.588	–53.1	21.24	144.3	0.0275	66.3	0.826	–31.8
400	0.482	–89.8	15.59	123.6	0.0423	56.6	0.619	–49.8
600	0.419	–115.9	11.75	111.0	0.0507	53.9	0.480	–58.7
800	0.389	–134.1	9.29	102.4	0.0581	54.5	0.395	–63.8
1000	0.366	–149.7	7.64	96.5	0.0652	55.8	0.337	–67.6
1200	0.365	–161.9	6.47	91.4	0.0726	57.3	0.300	–70.1
1400	0.354	–171.4	5.63	97.1	0.0806	58.7	0.274	–72.8
1600	0.356	–179.7	4.98	83.5	0.0877	60.4	0.255	–74.6
1800	0.361	172.7	4.48	79.9	0.0959	61.2	0.242	–77.1
2000	0.365	165.3	4.06	77.0	0.105	62.4	0.232	–79.9

Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
SC-61AA	PLSP0004ZA-A	MPAK-4 / MPAK-4V	0.013g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	1.0	—	1.3
A_1	0	—	0.1
A_2	1.0	1.1	1.2
A_3	—	0.25	—
b	0.35	0.42	0.5
b_1	0.55	0.62	0.7
b_2	—	0.4	—
b_3	—	0.6	—
c	0.1	0.13	0.15
c_1	—	0.11	—
D	2.7	—	3.1
E	1.35	1.5	1.65
e	—	0.95	—
e_2	—	0.85	—
H_E	2.2	2.8	3.0
L	0.35	—	0.75
L_1	0.15	—	0.55
L_P	0.25	—	0.65
x	—	—	0.05
y	—	—	0.05
b_4	—	—	0.55
b_5	—	—	0.75
e_1	—	1.95	—
I_1	—	—	1.05
Q	—	0.3	—

Ordering Information

Part Name	Quantity	Shipping Container
2SC5080ZD-TL-E	3000	ϕ 178 mm Reel, 8 mm Emboss Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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Colophon .3.0