

2SC5080

Silicon NPN Epitaxial

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

Application

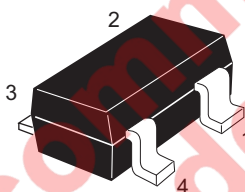
VHF / UHF wide band amplifier

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

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

| 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 | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

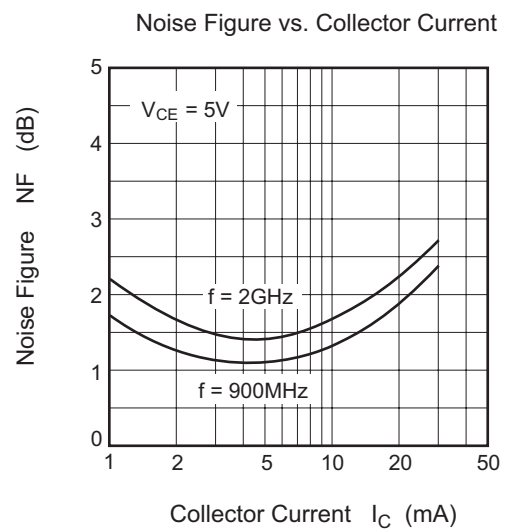
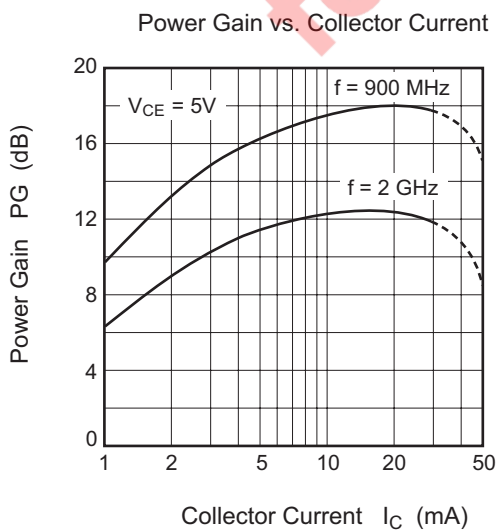
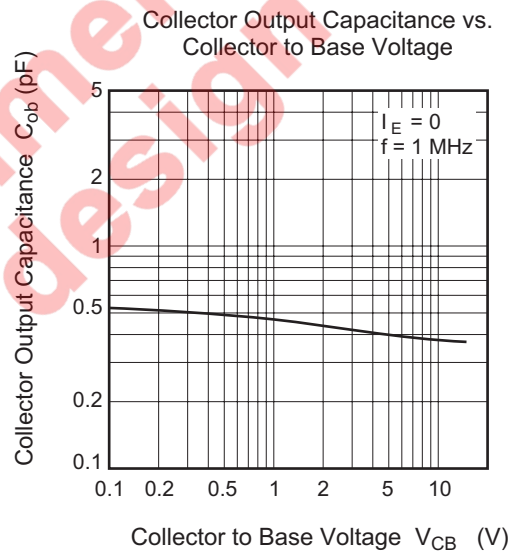
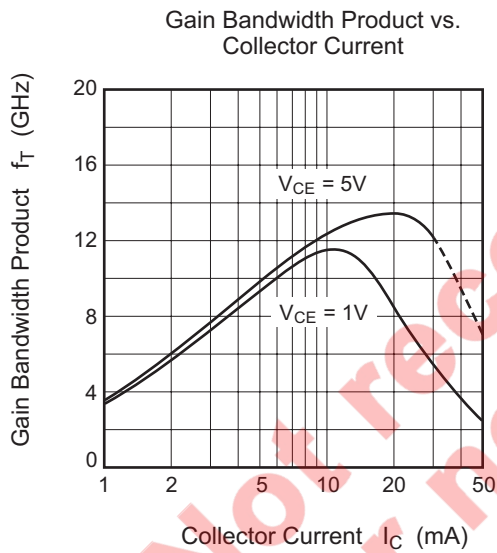
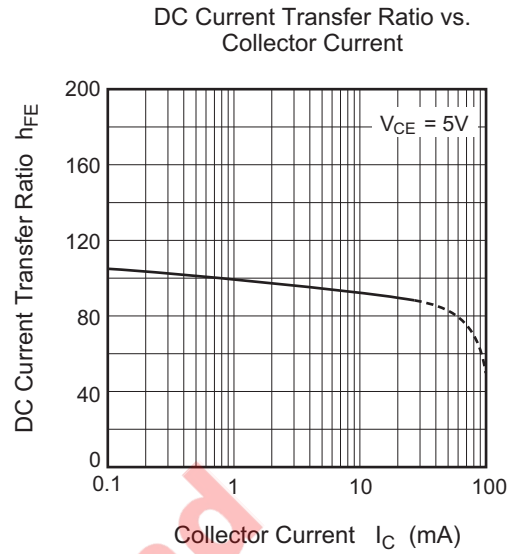
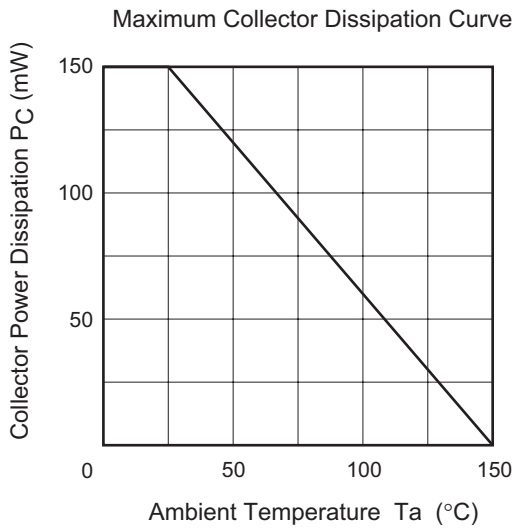
Electrical Characteristics

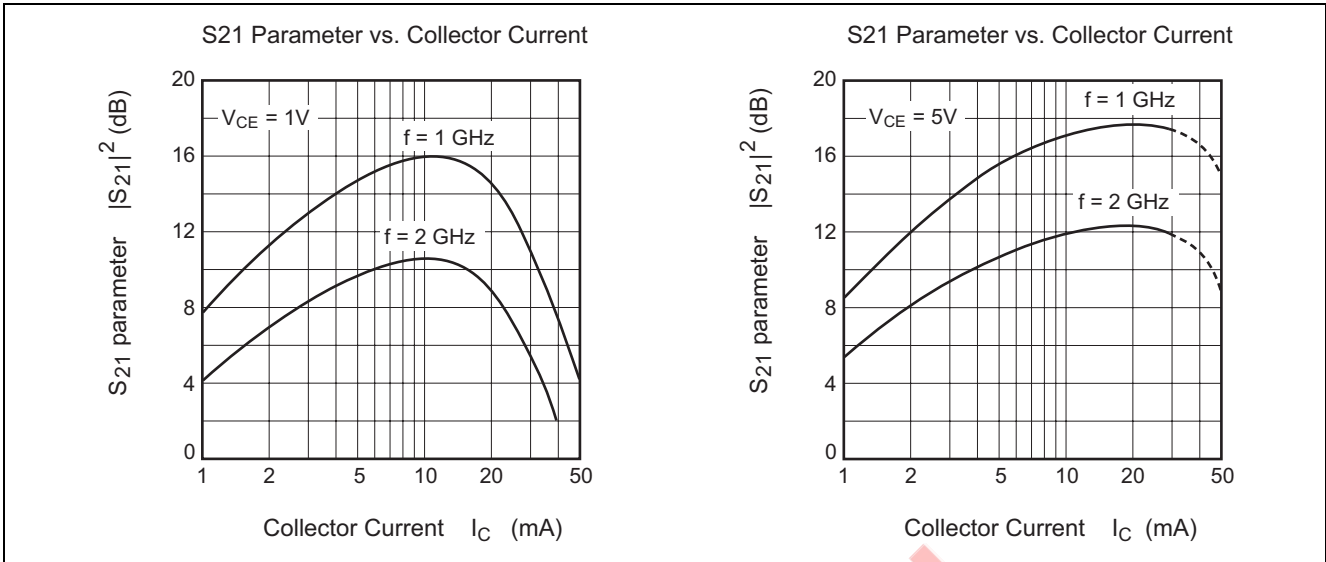
(Ta = 25°C)

| 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 | μA | $V_{CB} = 12 V, I_E = 0$ |
| | I_{CEO} | — | — | 1 | mA | $V_{CE} = 8 V, R_{BE} = \infty$ |
| 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 | C_{ob} | — | 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 | $V_{CE} = 5 V, I_C = 5 mA,$ $f = 900 MHz$ |

Not recommend
for new design

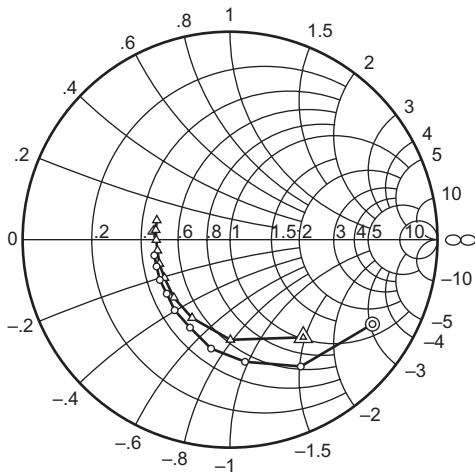
Main Characteristics





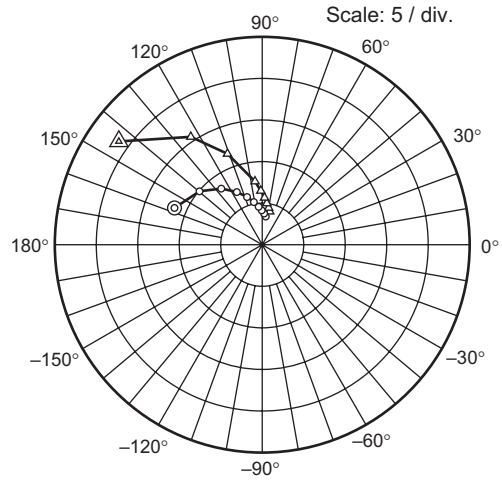
Not recommended for new design

S11 Parameter vs. Frequency



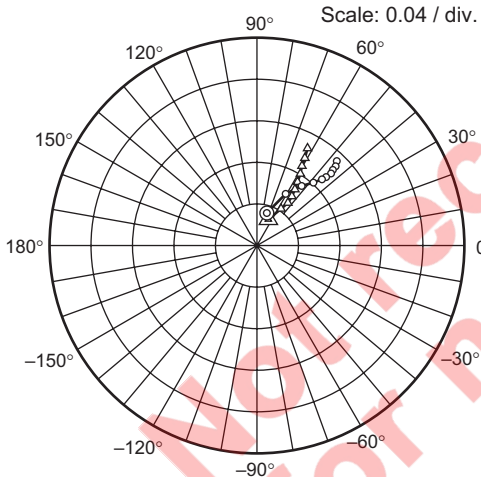
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ (IC = 5 mA)
 △ (IC = 20 mA)

S21 Parameter vs. Frequency



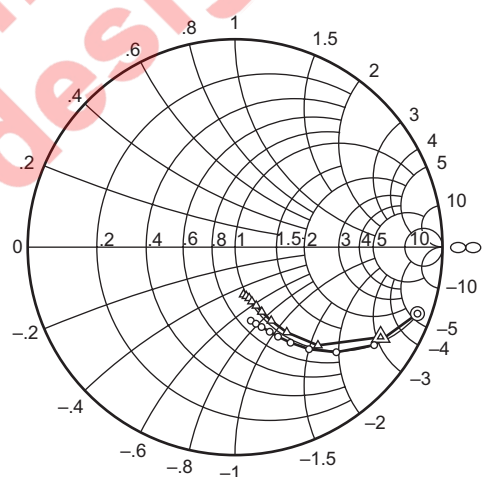
Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ (IC = 5 mA)
 △ (IC = 20 mA)

S12 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ (IC = 5 mA)
 △ (IC = 20 mA)

S22 Parameter vs. Frequency



Condition: $V_{CE} = 5\text{ V}$, $Z_o = 50\ \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ (IC = 5 mA)
 △ (IC = 20 mA)

S Parameters

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

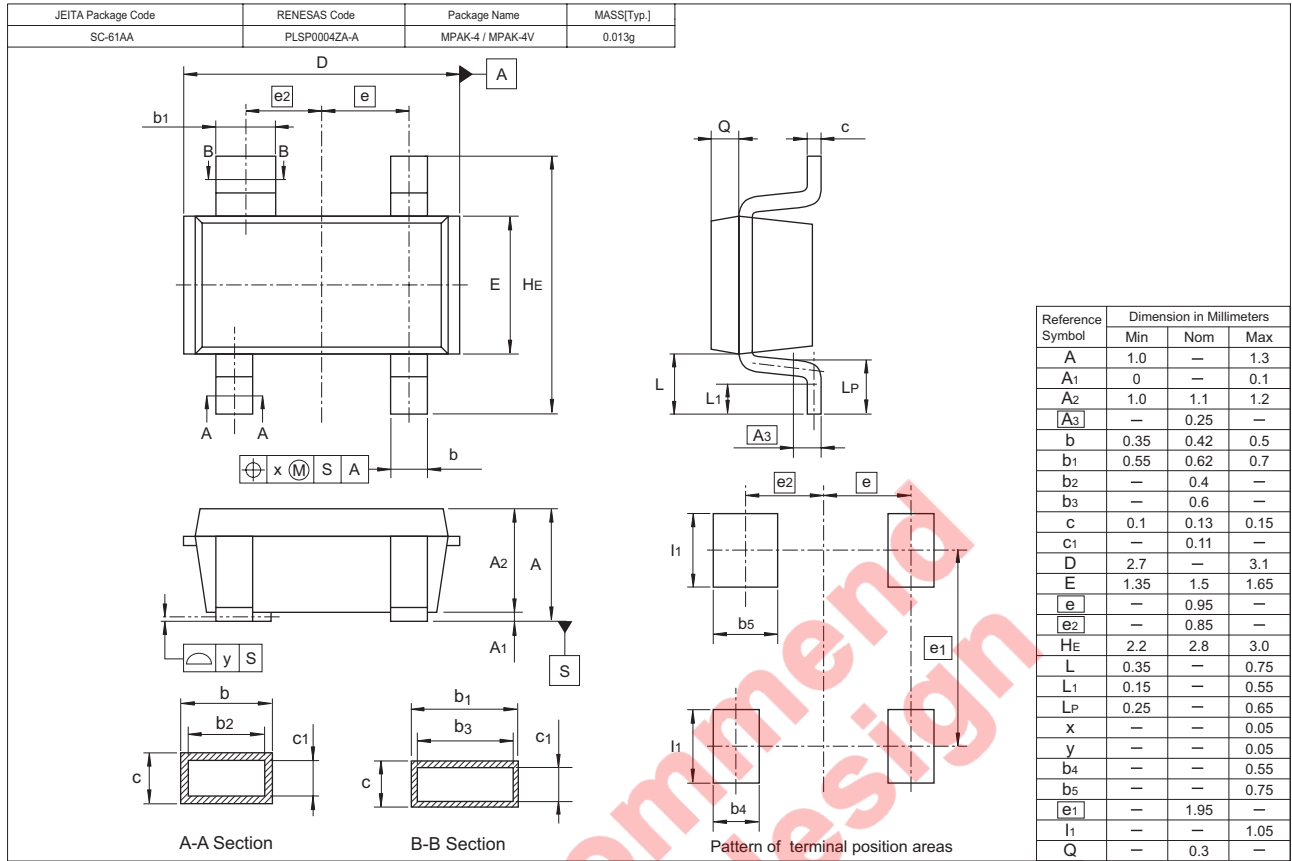
| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 200 | 0.798 | -30.8 | 11.47 | 157.3 | 0.0329 | 73.0 | 0.936 | -20.0 |
| 400 | 0.699 | -60.8 | 9.88 | 139.6 | 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

 $(V_{CE} = 5 \text{ V}, I_C = 20 \text{ mA}, Z_O = 50 \Omega)$

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | 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



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.

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Renesas Technology Europe Limited

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Renesas Technology Hong Kong Ltd.

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Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
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Renesas Technology Singapore Pte. Ltd.

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Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510