
2SC4900

Silicon NPN Epitaxial

HITACHI

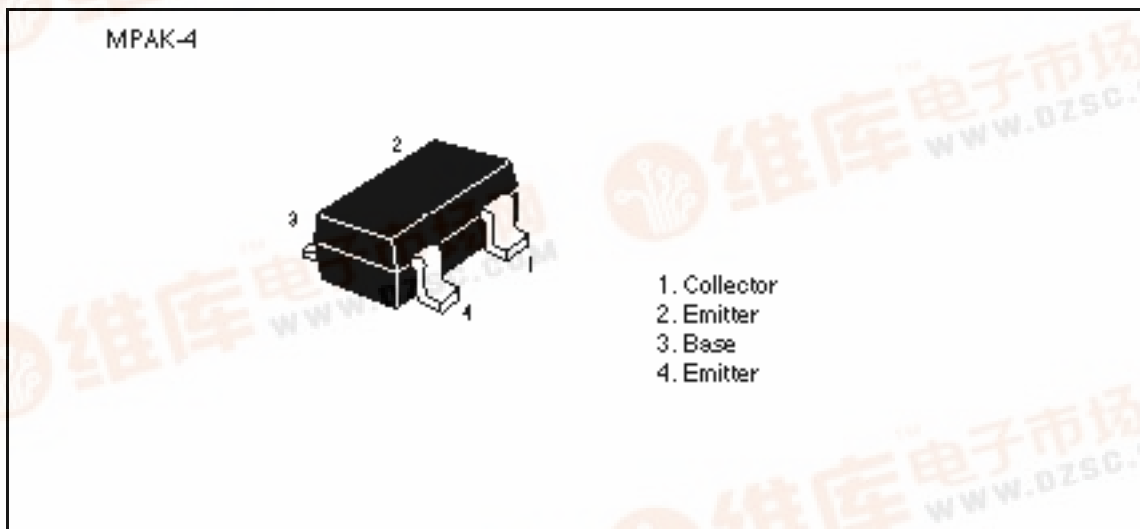
Application

VHF / UHF wide band amplifier

Features

- High gain bandwidth product
 $f_T = 9 \text{ GHz Typ}$
- High gain, low noise figure
 $PG = 13.0 \text{ dB Typ, NF} = 1.2 \text{ dB Typ at } f = 900 \text{ MHz}$

Outline



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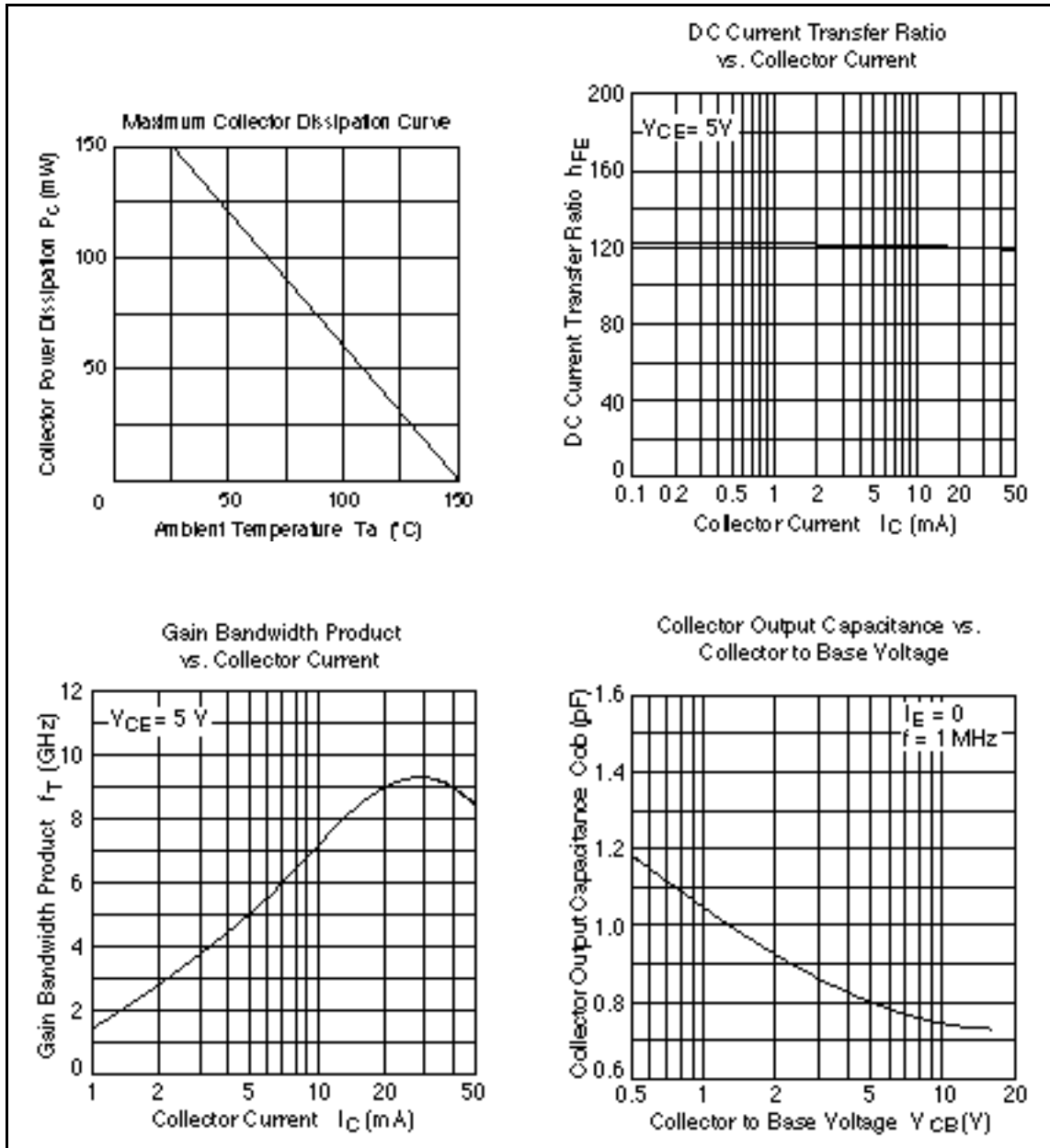
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|------------------------------|-----------|-------------|------|
| Collector to base voltage | V_{CBO} | 15 | V |
| Collector to emitter voltage | V_{CEO} | 9 | 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 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

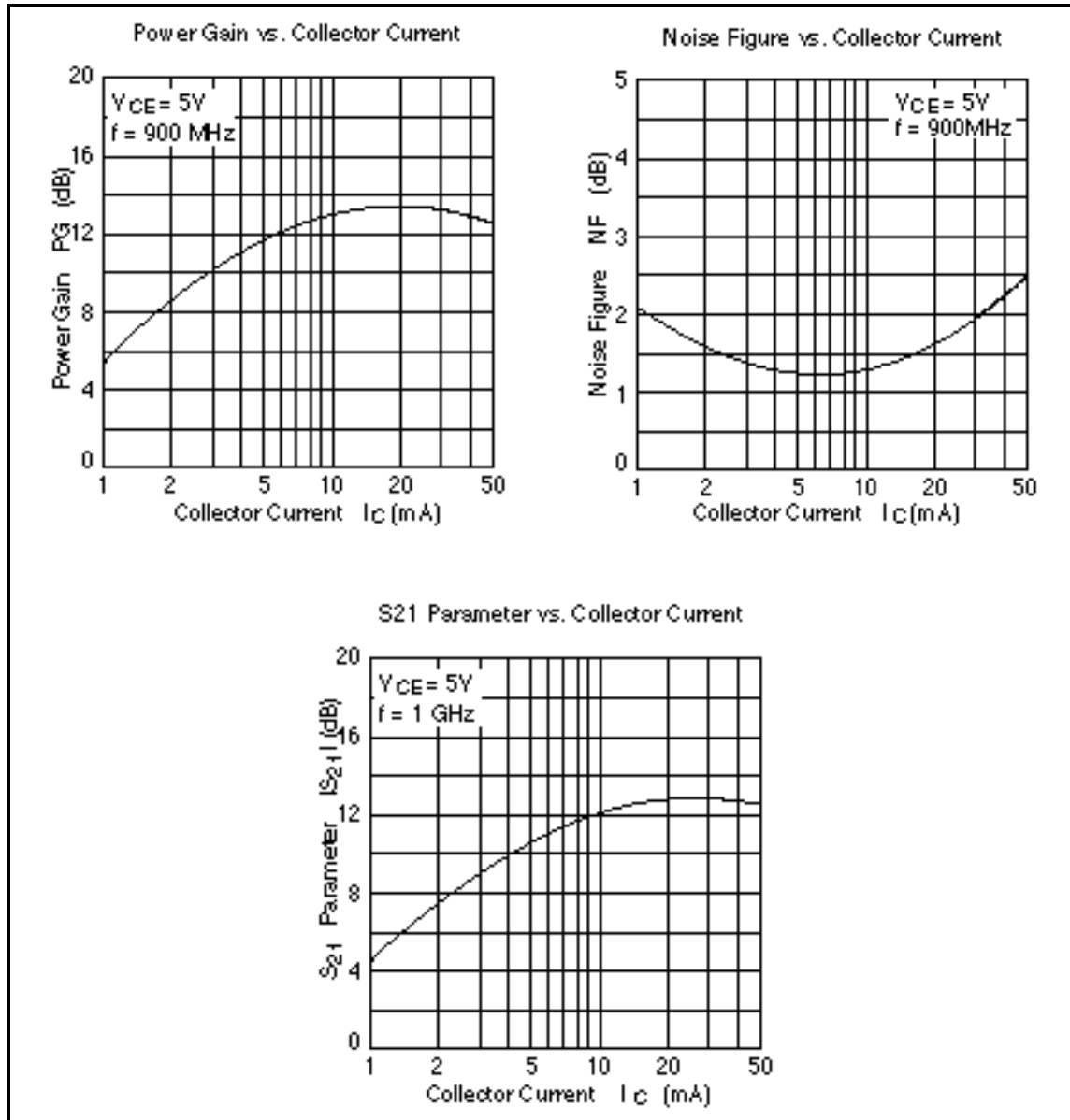
Electrical Characteristics (Ta = 25°C)

| 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} | — | — | 10 | μA | $V_{CB} = 12 V, I_E = 0$ |
| | I_{CEO} | — | — | 1 | mA | $V_{CE} = 9 V, R_{BE} =$ |
| Emitter cutoff current | I_{EBO} | — | — | 10 | μA | $V_{EB} = 1.5 V, I_C = 0$ |
| DC current transfer ratio | h_{FE} | 50 | 120 | 250 | | $V_{CE} = 5 V, I_C = 20 mA$ |
| Collector output capacitance | C_{ob} | — | 0.8 | 1.3 | pF | $V_{CB} = 5 V, I_E = 0, f = 1 MHz$ |
| Gain bandwidth product | f_T | 6.0 | 9.0 | — | GHz | $V_{CE} = 5 V, I_C = 20 mA$ |
| Power gain | PG | 10.5 | 13.5 | — | dB | $V_{CE} = 5 V, I_C = 20 mA,$ $f = 900 MHz$ |
| Noise figure | NF | — | 1.2 | 2.5 | dB | $V_{CE} = 5 V, I_C = 5 mA,$ $f = 900 MHz$ |

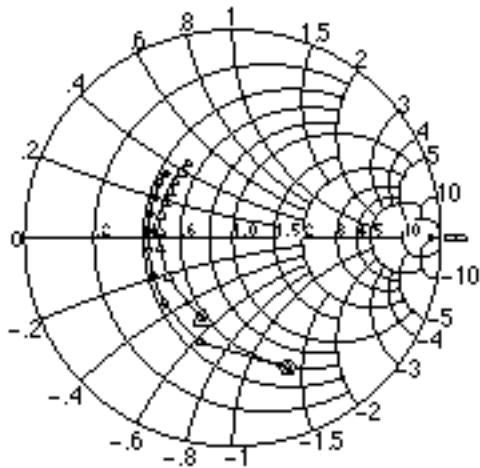
Note: Marking is "YJ-".



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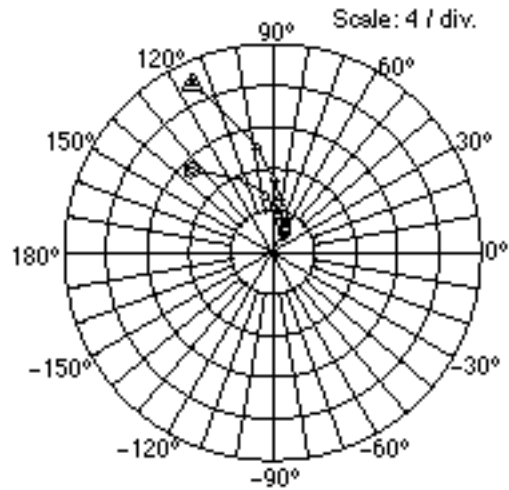
S11 Parameter vs. Frequency



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

⊙ — ○ ($I_C = 5\text{ mA}$)
⊠ — △ ($I_C = 20\text{ mA}$)

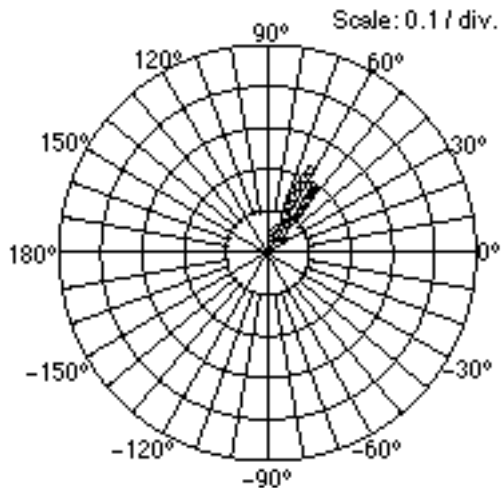
S21 Parameter vs. Frequency



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

⊙ — ○ ($I_C = 5\text{ mA}$)
⊠ — △ ($I_C = 20\text{ mA}$)

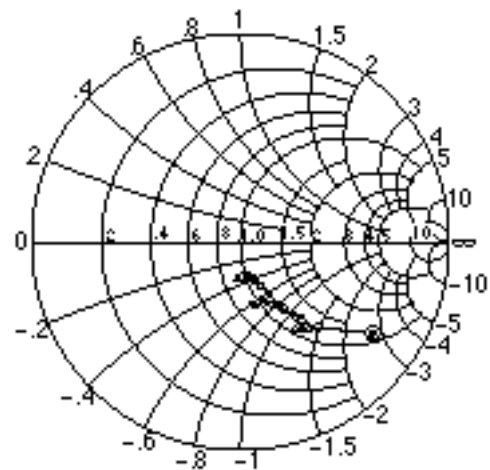
S12 Parameter vs. Frequency



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

⊙ — ○ ($I_C = 5\text{ mA}$)
⊠ — △ ($I_C = 20\text{ mA}$)

S22 Parameter vs. Frequency



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

⊙ — ○ ($I_C = 5\text{ mA}$)
⊠ — △ ($I_C = 20\text{ mA}$)

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

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 200 | 0.678 | -67.0 | 11.09 | 134.6 | 0.0572 | 59.2 | 0.772 | -34.7 |
| 400 | 0.523 | -107.6 | 7.49 | 111.6 | 0.0802 | 48.8 | 0.556 | -47.8 |
| 600 | 0.453 | -135.8 | 5.43 | 98.3 | 0.0933 | 47.1 | 0.443 | -53.7 |
| 800 | 0.423 | -155.2 | 4.24 | 89.0 | 0.105 | 47.8 | 0.382 | -57.2 |
| 1000 | 0.407 | -172.1 | 3.47 | 81.6 | 0.118 | 49.7 | 0.348 | -60.2 |
| 1200 | 0.412 | 174.7 | 2.94 | 75.0 | 0.130 | 50.7 | 0.330 | -62.9 |
| 1400 | 0.414 | 163.5 | 2.54 | 69.2 | 0.145 | 51.9 | 0.318 | -66.5 |
| 1600 | 0.423 | 152.3 | 2.26 | 64.3 | 0.158 | 52.7 | 0.312 | -70.3 |
| 1800 | 0.438 | 143.2 | 2.05 | 59.2 | 0.174 | 53.3 | 0.307 | -74.4 |
| 2000 | 0.446 | 135.7 | 1.87 | 55.0 | 0.189 | 53.4 | 0.305 | -78.4 |

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

| Freq. (MHz) | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|-------|-------|--------|------|-------|-------|
| | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. | MAG. | ANG. |
| 200 | 0.420 | -110.3 | 17.91 | 115.5 | 0.0381 | 59.7 | 0.502 | -54.1 |
| 400 | 0.362 | -148.9 | 10.13 | 98.4 | 0.0572 | 62.2 | 0.311 | -62.8 |
| 600 | 0.351 | -170.5 | 6.94 | 89.2 | 0.0766 | 64.7 | 0.240 | -66.1 |
| 800 | 0.352 | 175.2 | 5.29 | 82.9 | 0.0966 | 65.7 | 0.207 | -69.1 |
| 1000 | 0.361 | 162.7 | 4.27 | 77.1 | 0.117 | 65.8 | 0.189 | -71.6 |
| 1200 | 0.364 | 153.1 | 3.60 | 72.3 | 0.138 | 65.1 | 0.181 | -75.1 |
| 1400 | 0.373 | 143.9 | 3.12 | 67.9 | 0.158 | 64.0 | 0.178 | -79.3 |
| 1600 | 0.386 | 136.2 | 2.76 | 63.6 | 0.178 | 62.5 | 0.176 | -83.3 |
| 1800 | 0.396 | 128.2 | 2.49 | 59.4 | 0.199 | 61.3 | 0.177 | -87.5 |
| 2000 | 0.414 | 121.3 | 2.27 | 55.5 | 0.218 | 59.8 | 0.178 | -91.9 |

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