

| | | |
|--------------|---------|---|
| SANYO | No.2971 | 2SC4270 |
| | | NPN Epitaxial Planar Silicon Transistor |
| | | UHF Converter, Local Oscillator Applications |

Features

- Small noise figure : NF = 3.0dB typ (f = 0.9GHz)
- High power gain : PG = 12dB typ (f = 0.9GHz)
- High cutoff frequency : $f_T = 3.0\text{GHz}$ typ

Absolute Maximum Ratings at Ta = 25°C

| | | | unit |
|------------------------------|------------------|-------------|------|
| Collector to Base Voltage | V _{CB0} | 25 | V |
| Collector to Emitter Voltage | V _{CEO} | 15 | V |
| Emitter to Base Voltage | V _{EBO} | 3 | V |
| Collector Current | I _C | 50 | mA |
| Base Current | I _B | 20 | mA |
| Collector Dissipation | P _C | 250 | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

Electrical Characteristics at Ta = 25°C

| | | | min | typ | max | unit |
|------------------------------|------------------|--|-----|------|------|------|
| Collector Cutoff Current | I _{CBO} | V _{CB} = 20V, I _E = 0 | | | 0.1 | μA |
| Emitter Cutoff Current | I _{EBO} | V _{EB} = 2V, I _C = 0 | | | 10 | μA |
| DC Current Gain | h _{FE} | V _{CE} = 10V, I _C = 5mA | 40* | | 200* | |
| Gain-Bandwidth Product | f _T | V _{CE} = 10V, I _C = 10mA | 1.5 | 3.0 | | GHz |
| Output Capacitance | c _{ob} | V _{CB} = 10V, f = 1MHz | | 0.7 | 1.0 | pF |
| Reverse Transfer Capacitance | c _{re} | V _{CB} = 10V, f = 1MHz | | 0.45 | | pF |
| Power Gain | PG | V _{CE} = 10V, I _C = 10mA, f = 0.9GHz | | 12 | | dB |
| Noise Figure | NF | V _{CE} = 10V, I _C = 3mA, f = 0.9GHz | | 3.0 | | dB |

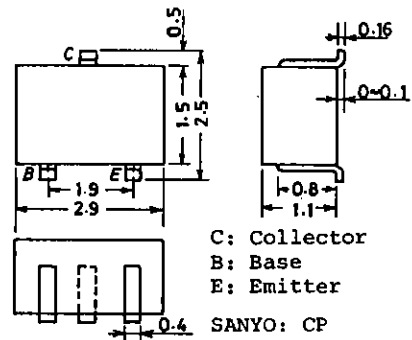
* : The 2SC4270 is classified by 5mA h_{FE} as follows:

| | | | | | | | | |
|----|---|----|----|---|-----|-----|---|-----|
| 40 | 2 | 80 | 60 | 3 | 120 | 100 | 4 | 200 |
|----|---|----|----|---|-----|-----|---|-----|

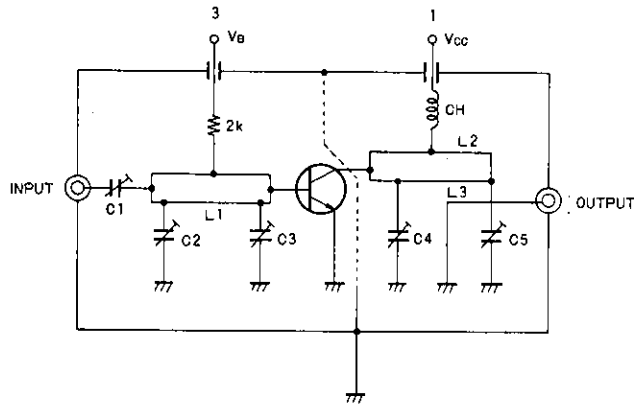
(Note) Marking : KT
h_{FE} rank : 2,3,4

Package Dimensions 2018A

(unit : mm)

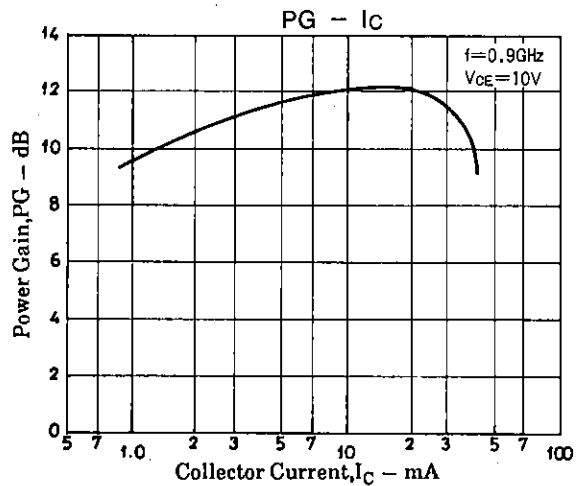
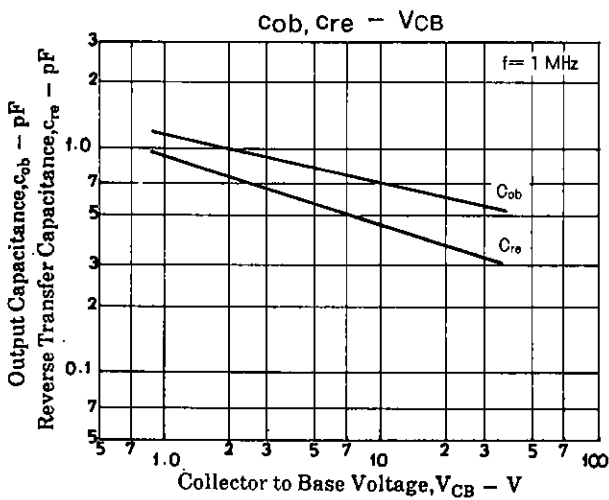
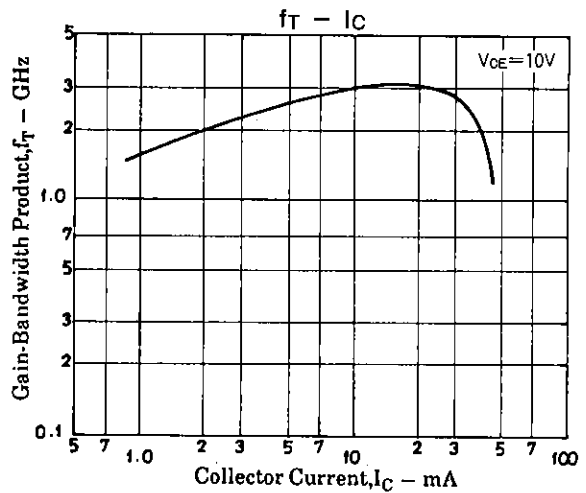
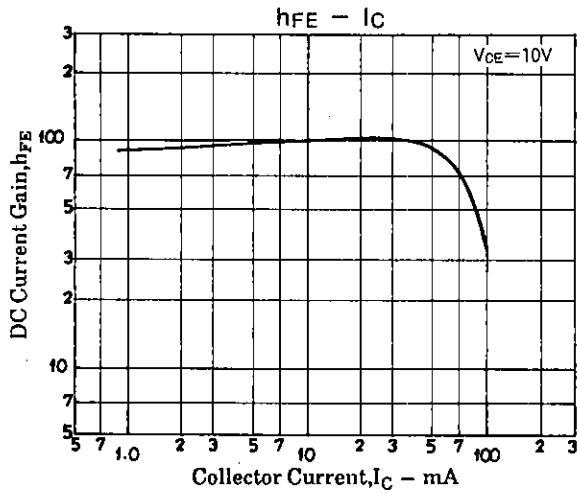


PG, NF Test Circuit

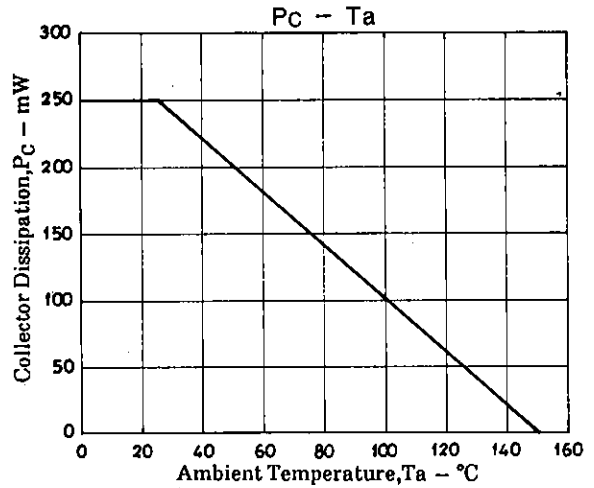
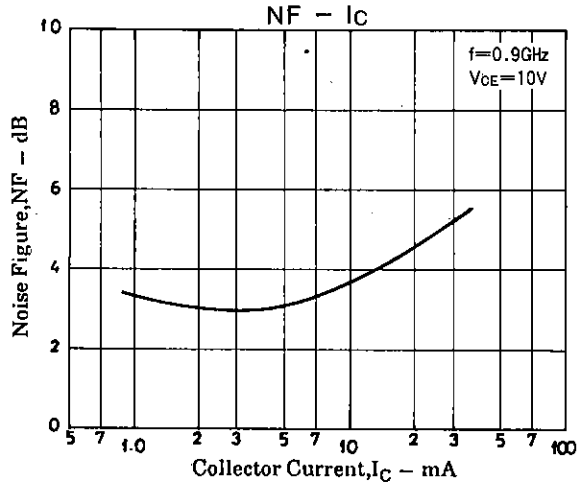


Unit (Resistance : Ω)

| 900MHz | |
|--------|--|
| C1 | ~ 5 pF |
| C2 | ~ 10 pF |
| C3 | ~ 10 pF |
| C4 | ~ 10 pF |
| C5 | ~ 10 pF |
| L1 | $W \neq 1.5$ mm, $l \neq 25$ mm strip line |
| L2 | $W \neq 4$ mm, $l \neq 25$ mm strip line |
| L3 | 0.5ϕ , $l \neq 40$ mm |
| CH | $2t +$ bead core |



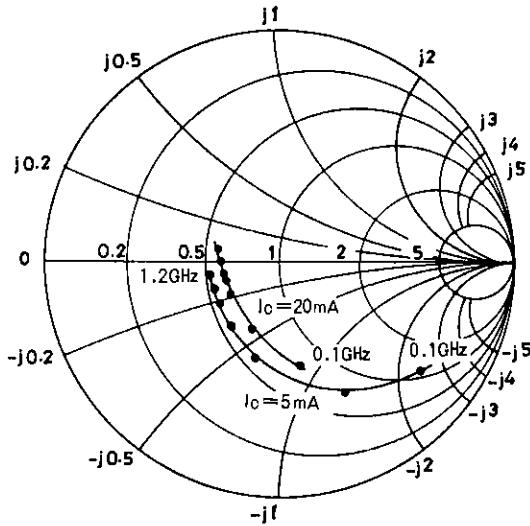
2SC4270



S parameter

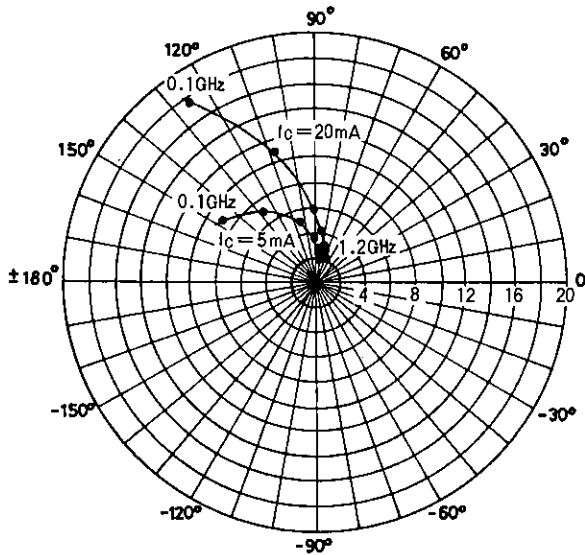
S11e : $V_{CE}=10\text{V}$

$f=100\text{MHz}, 200\sim 1200\text{MHz}(200\text{MHz step})$



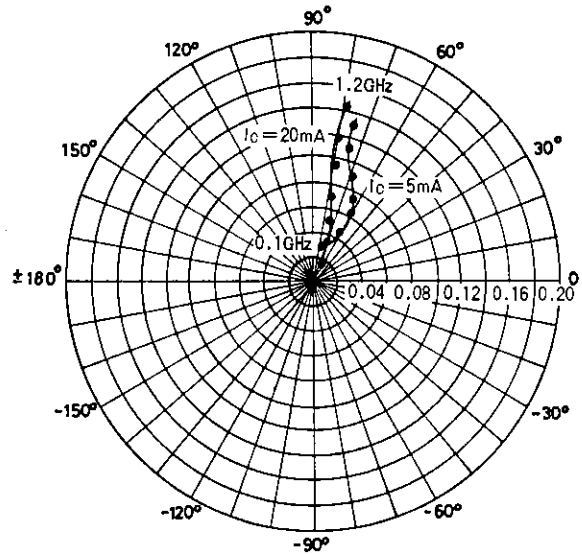
S21e : $V_{CE}=10\text{V}$

$f=100\text{MHz}, 200\sim 1200\text{MHz}(200\text{MHz step})$



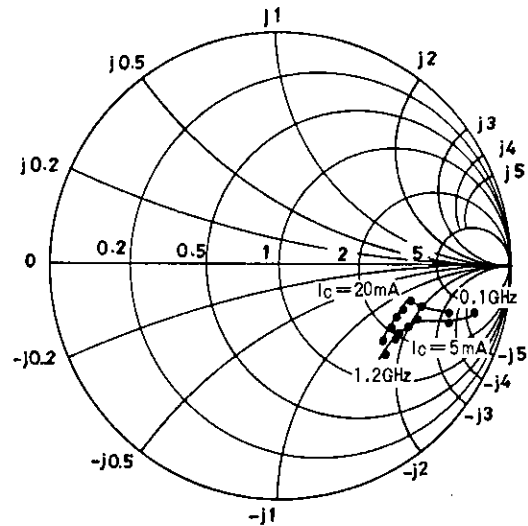
S12e : $V_{CE}=10\text{V}$

$f=100\text{MHz}, 200\sim 1200\text{MHz}(200\text{MHz step})$



S22e : $V_{CE}=10\text{V}$

$f=100\text{MHz}, 200\sim 1200\text{MHz}(200\text{MHz step})$



S parameter (Common emitter)V_{CE}=10V, I_C=5 mA, Z_O=50Ω

| Freq (MHz) | S ₁₁ | ∠S ₁₁ | S ₂₁ | ∠S ₂₁ | S ₁₂ | ∠S ₁₂ | S ₂₂ | ∠S ₂₂ |
|------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| 100 | 0.771 | -35.1 | 8.763 | 147.2 | 0.027 | 69.3 | 0.890 | -14.2 |
| 200 | 0.613 | -64.7 | 7.004 | 127.6 | 0.043 | 59.8 | 0.780 | -19.7 |
| 400 | 0.429 | -110.7 | 4.882 | 103.1 | 0.061 | 58.1 | 0.660 | -22.8 |
| 600 | 0.361 | -133.5 | 3.471 | 90.5 | 0.075 | 63.1 | 0.625 | -25.1 |
| 800 | 0.355 | -148.4 | 2.693 | 81.6 | 0.091 | 68.1 | 0.612 | -28.6 |
| 900 | 0.331 | -153.7 | 2.450 | 78.9 | 0.100 | 70.5 | 0.609 | -29.9 |
| 1000 | 0.328 | -158.9 | 2.236 | 75.5 | 0.110 | 72.5 | 0.607 | -31.6 |
| 1200 | 0.326 | -167.9 | 1.932 | 69.9 | 0.130 | 74.7 | 0.608 | -35.7 |

V_{CE}=10V, I_C=20mA, Z_O=50Ω

| Freq (MHz) | S ₁₁ | ∠S ₁₁ | S ₂₁ | ∠S ₂₁ | S ₁₂ | ∠S ₁₂ | S ₂₂ | ∠S ₂₂ |
|------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| 100 | 0.447 | -78.1 | 17.728 | 125.0 | 0.020 | 66.0 | 0.752 | -18.5 |
| 200 | 0.338 | -113.2 | 10.936 | 107.5 | 0.031 | 66.5 | 0.639 | -18.5 |
| 400 | 0.290 | -146.6 | 5.773 | 91.4 | 0.052 | 72.1 | 0.580 | -18.5 |
| 600 | 0.281 | -159.3 | 3.956 | 83.0 | 0.074 | 75.7 | 0.571 | -21.1 |
| 800 | 0.285 | -168.8 | 2.982 | 76.2 | 0.095 | 77.6 | 0.566 | -25.2 |
| 900 | 0.289 | -171.3 | 2.703 | 74.0 | 0.106 | 78.6 | 0.563 | -26.7 |
| 1000 | 0.291 | -174.4 | 2.454 | 71.3 | 0.118 | 79.4 | 0.565 | -28.6 |
| 1200 | 0.297 | -178.1 | 2.116 | 66.5 | 0.140 | 79.0 | 0.569 | -33.1 |

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