

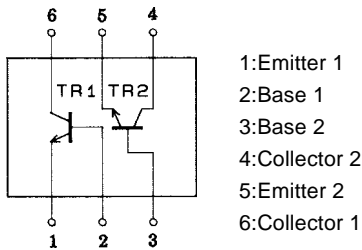


FC152

PNP Epitaxial Planar Silicon Composite Transistor High-Frequency Amp, Differential Amp Applications

Features

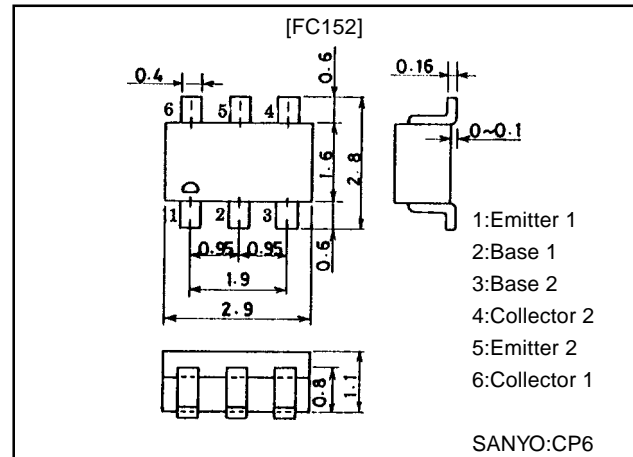
- Composite type with 2 transistors contained in the CP package currently in use, improving the mounting efficiency greatly.
- The FC152 is formed with two chips, being equivalent to the 2SC4270, placed in one package.
- Excellent in thermal equilibrium, pair capability and especially suited for differential amp.



Package Dimensions

unit:mm

2104A



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | 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 |
| Collector Dissipation | P_C | 1 unit | 200 | mW |
| Total Dissipation | P_T | | 300 | mW |
| Junction Temperature | T_j | | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--------------------------|------------------------------|---|---------|------|-----|---------------|
| | | | min | typ | max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB}=20\text{V}, I_E=0$ | | | 0.1 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB}=2\text{V}, I_C=0$ | | | 10 | μA |
| DC Current Gain | h_{FE} | $V_{CE}=10\text{V}, I_C=5\text{mA}$ | 60 | | 200 | |
| DC Current Gain Ratio | $h_{FE}(\text{small/large})$ | $V_{CE}=10\text{V}, I_C=5\text{mA}$ | 0.7 | 0.95 | | |
| B-E Voltage Difference | $V_{BE}(\text{large-small})$ | $V_{CE}=10\text{V}, I_C=0$ | | 3.0 | 10 | mV |
| Gain-Bandwidth Product | f_T | $V_{CE}=10\text{V}, I_C=10\text{mA}$ | 1.5 | 3.0 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB}=10\text{V}, f=1\text{MHz}$ | | 0.7 | 1.0 | pF |
| Power Gain | PG | $V_{CE}=10\text{V}, I_C=10\text{mA}, f=0.9\text{GHz}$ | | 12 | | dB |
| Noise Figure | NF | $V_{CE}=10\text{V}, I_C=3\text{mA}, f=0.9\text{GHz}$ | | 3.0 | | dB |

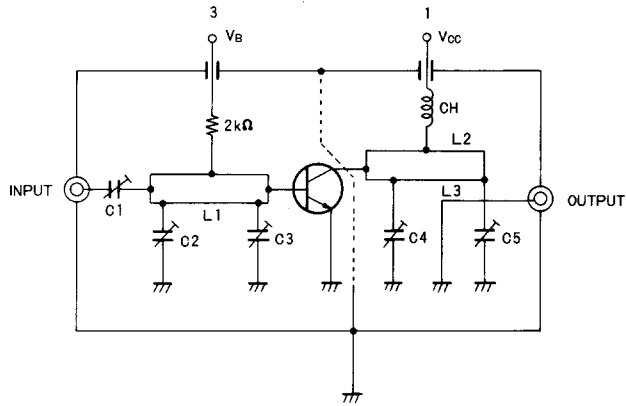
Note: The specifications shown above are for each individual transistor. However, the specifications of $h_{FE}(\text{small/large})$ and $V_{BE}(\text{large-small})$ are for pair capability

Marking:152

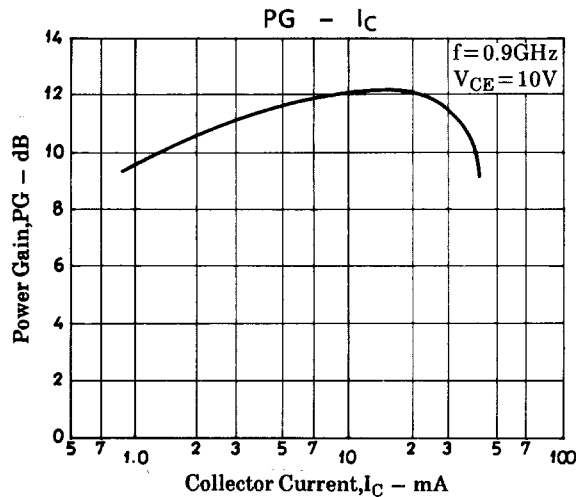
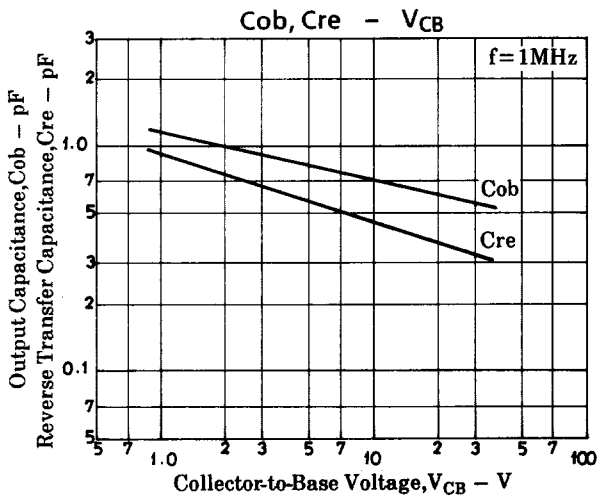
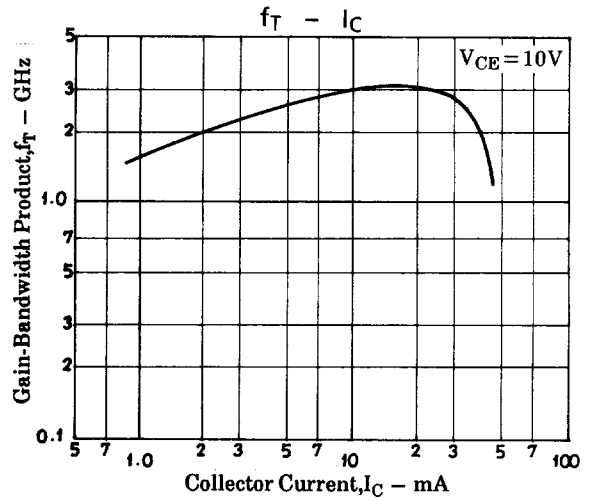
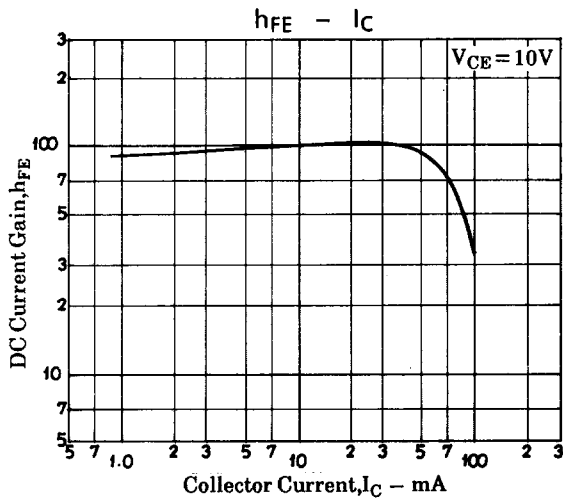
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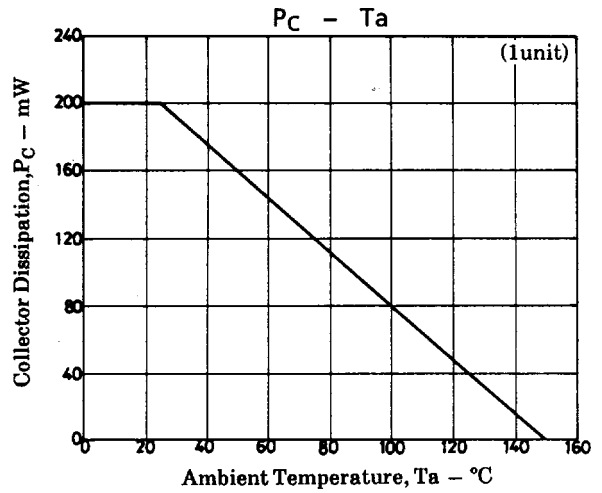
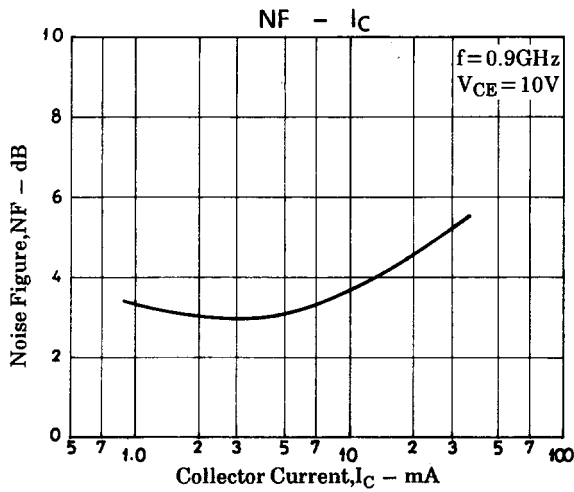
PG, NF Test Circuit



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



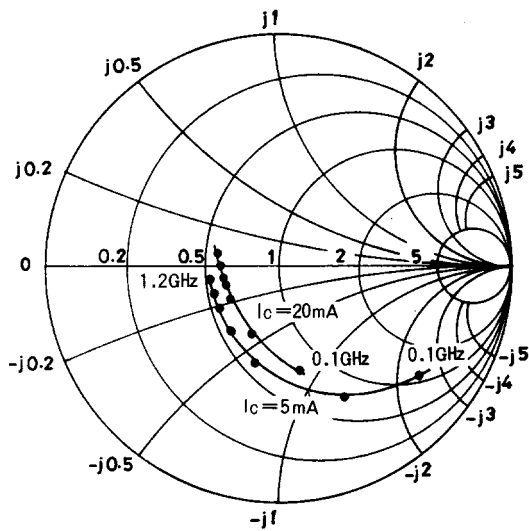
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S Parameter

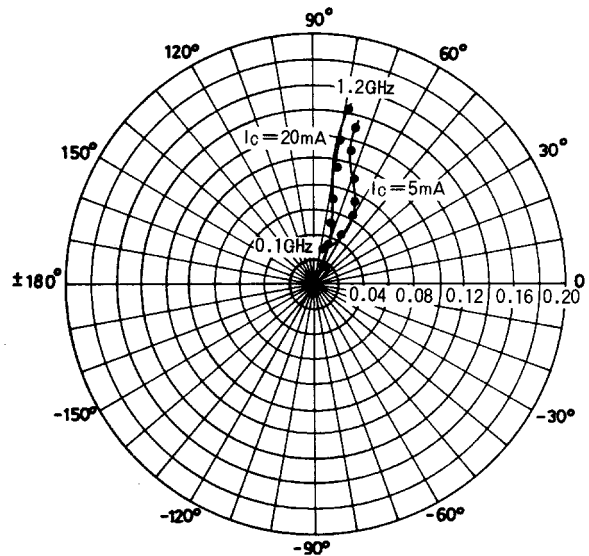
S11e: $V_{CE} = 10\text{V}$

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



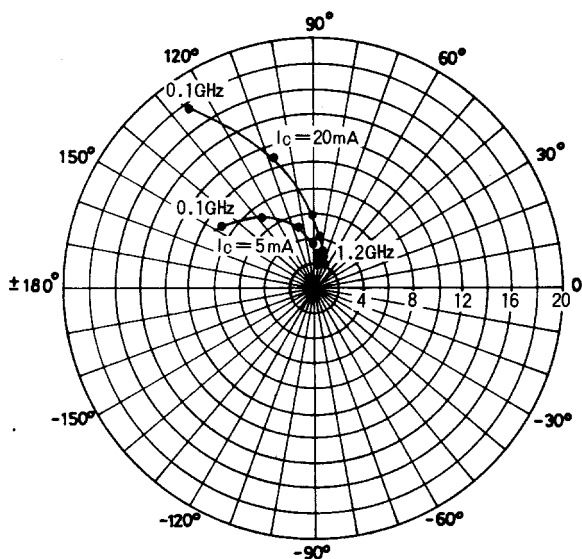
S12e: $V_{CE} = 10\text{V}$

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



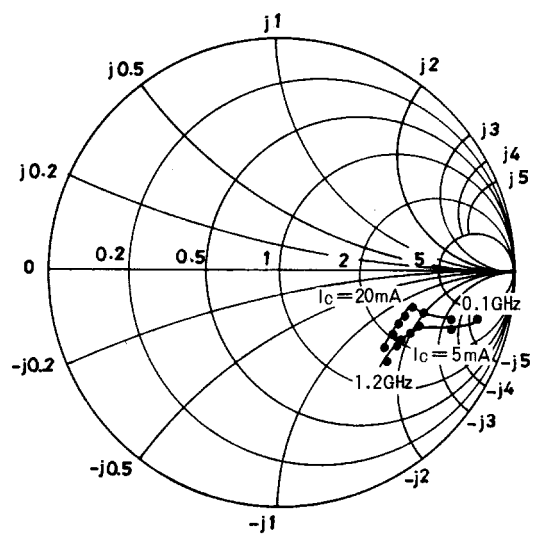
S21e: $V_{CE} = 10\text{V}$

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



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

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



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S Parameter (Common-emitter)

$V_{CE} = 10V, I_C = 5mA, Z_0 = 50\Omega$

| 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 |

$V_{CE} = 10V, I_C = 20mA, Z_0 = 50\Omega$

| 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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