

SANYO

No.5295A

2SC4931

NPN Epitaxial Planar Silicon Transistor

VHF to UHF Wide-Band Low-Noise Amp
Applications**Features**

- Low noise : $NF = 1.2\text{dB typ (}f = 1\text{GHz)}$.
- High gain : $|S_{21e}|^2 = 13\text{dB typ (}f = 1\text{GHz)}$.
- High cutoff frequency : $f_T = 9.0\text{GHz typ}$.
- Very small-sized package permitting 2SC4931-applied sets to be made small and slim.

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

| | | | unit |
|------------------------------|-----------|-------------|------------------|
| Collector-to-Base Voltage | V_{CB0} | 16 | 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 Dissipation | P_C | 100 | mW |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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

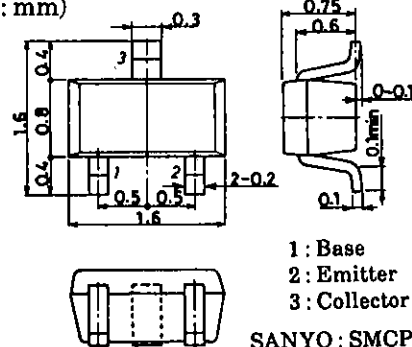
| | | | min | typ | max | unit |
|--------------------------|---------------|--|-----|------|------|---------------|
| Collector Cutoff Current | I_{CB0} | $V_{CB} = 10\text{V}, I_E = 0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 1\text{V}, I_C = 0$ | | | 10 | μA |
| DC Current Gain | h_{FE} | $V_{CE} = 5\text{V}, I_C = 15\text{mA}$ | 60* | | 270* | |
| Gain-Bandwidth Product | f_T | $V_{CE} = 5\text{V}, I_C = 15\text{mA}$ | | 9.0 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ | | 0.55 | 1.2 | pF |
| Forward Transfer Gain | $ S_{21e} ^2$ | $V_{CE} = 5\text{V}, I_C = 15\text{mA}, f = 1\text{GHz}$ | 10 | 13 | | dB |
| Noise Figure | NF | $V_{CE} = 5\text{V}, I_C = 5\text{mA}, f = 1\text{GHz}$ | | 1.2 | 2.5 | dB |

* : Pulse Width $\leq 2\text{ms}$ * : The 2SC4931 is classified by 15mA h_{FE} as follows :

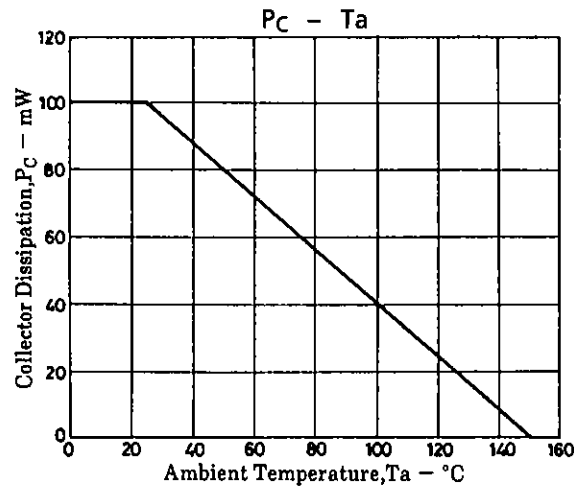
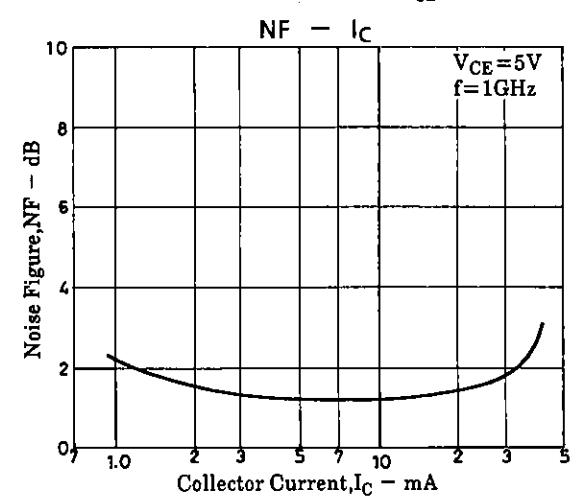
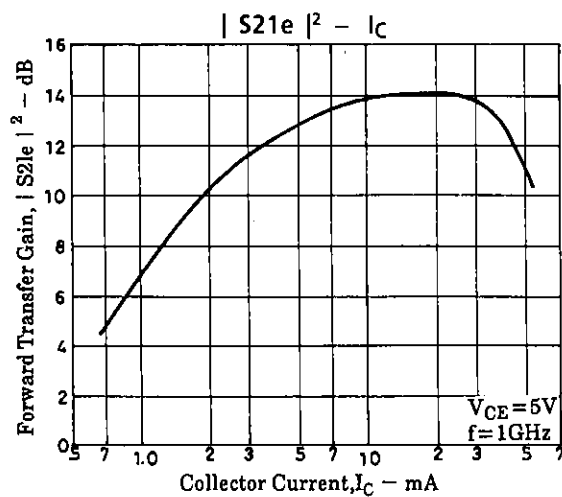
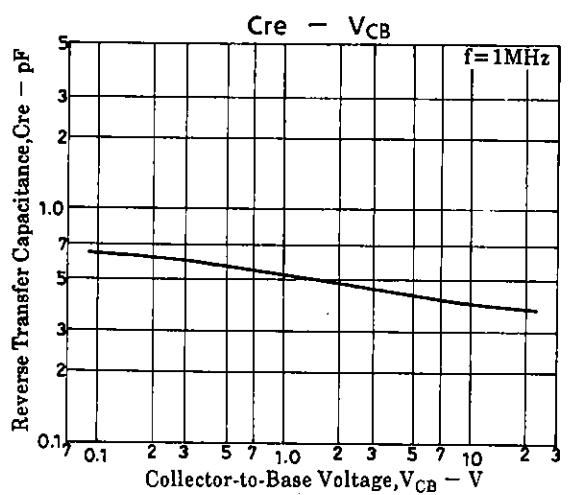
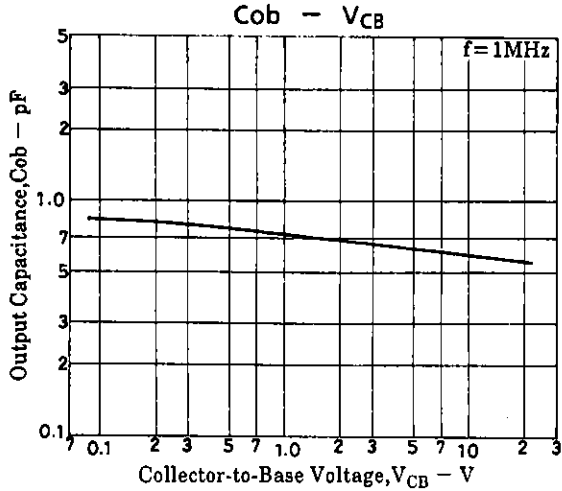
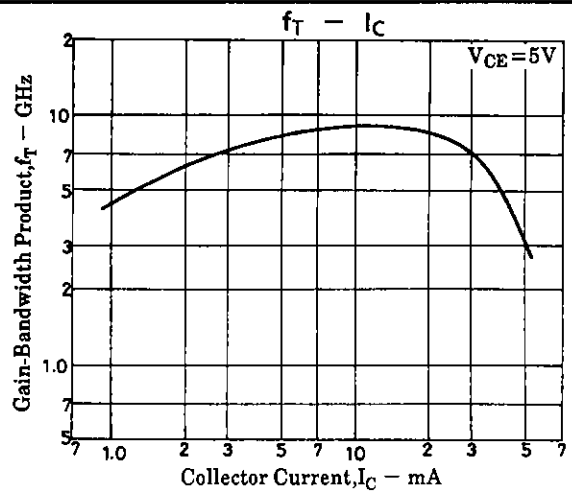
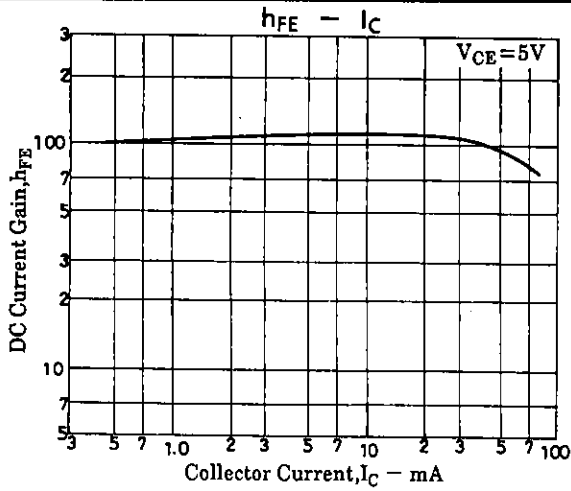
| Marking | B1 | B2 | B3 |
|----------|-----------|-----------|------------|
| h_{FE} | 60 to 120 | 90 to 180 | 135 to 270 |

Package Dimensions 2106A

(unit : mm)

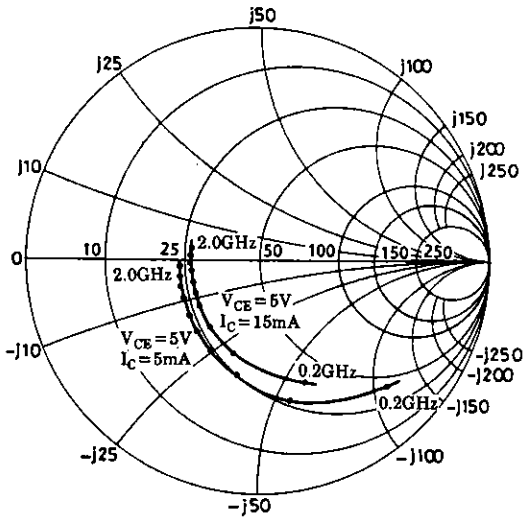


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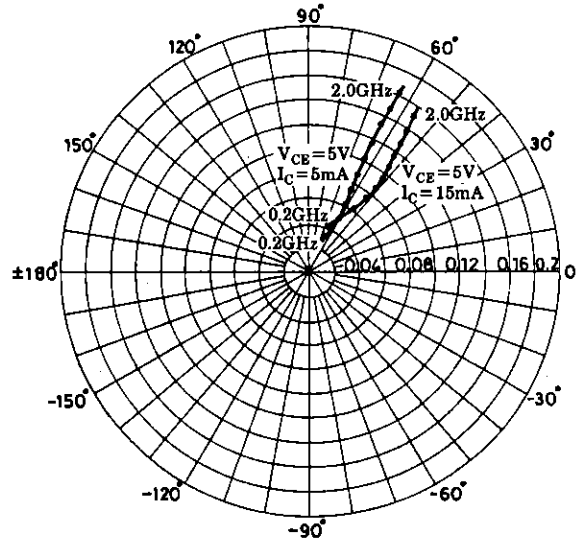


S Parameter

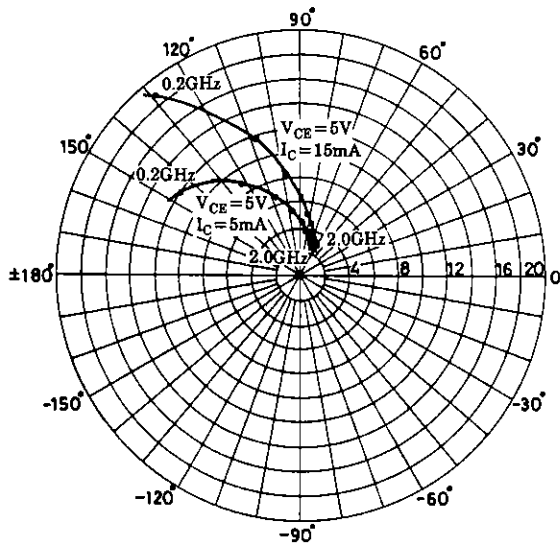
S11e
f=200 to 2000MHz (200MHz Step)



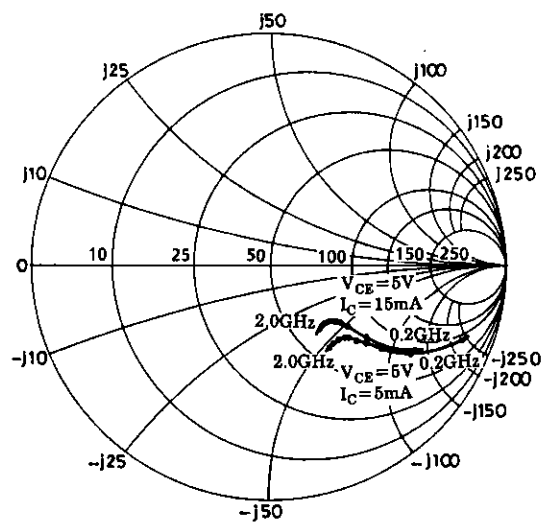
S12e
f=200 to 2000MHz (200MHz Step)



S21e
f=200 to 2000MHz (200MHz Step)



S22e
f=200 to 2000MHz (200MHz Step)



S Parameter (Common emitter) $V_{CE}=5V, I_C=5mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.775 | -45.2 | 11.958 | 144.8 | 0.040 | 67.3 | 0.872 | -21.4 |
| 400 | 0.620 | -78.1 | 8.989 | 122.3 | 0.063 | 56.2 | 0.704 | -32.1 |
| 600 | 0.517 | -100.9 | 6.908 | 107.9 | 0.076 | 52.2 | 0.594 | -36.7 |
| 800 | 0.451 | -117.9 | 5.487 | 97.6 | 0.087 | 51.3 | 0.529 | -39.2 |
| 1000 | 0.411 | -131.5 | 4.553 | 89.8 | 0.097 | 51.9 | 0.491 | -40.9 |
| 1200 | 0.385 | -142.0 | 3.899 | 83.4 | 0.107 | 52.7 | 0.467 | -42.5 |
| 1400 | 0.372 | -152.5 | 3.411 | 77.3 | 0.117 | 53.7 | 0.451 | -44.1 |
| 1600 | 0.364 | -161.7 | 3.052 | 71.3 | 0.129 | 54.7 | 0.438 | -46.2 |
| 1800 | 0.353 | -168.5 | 2.740 | 66.7 | 0.139 | 55.4 | 0.435 | -48.8 |
| 2000 | 0.349 | -176.6 | 2.507 | 62.7 | 0.152 | 56.2 | 0.435 | -51.2 |

 $V_{CE}=5V, I_C=15mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.560 | -70.0 | 19.044 | 129.1 | 0.032 | 63.2 | 0.710 | -31.1 |
| 400 | 0.422 | -106.3 | 11.887 | 108.4 | 0.048 | 59.7 | 0.515 | -37.2 |
| 600 | 0.364 | -127.3 | 8.449 | 97.5 | 0.061 | 61.3 | 0.430 | -37.9 |
| 800 | 0.330 | -143.0 | 6.510 | 89.6 | 0.075 | 62.5 | 0.391 | -38.8 |
| 1000 | 0.315 | -153.4 | 5.285 | 83.6 | 0.089 | 63.5 | 0.371 | -39.7 |
| 1200 | 0.306 | -161.8 | 4.484 | 78.4 | 0.103 | 64.1 | 0.360 | -41.0 |
| 1400 | 0.302 | -170.7 | 3.898 | 73.4 | 0.118 | 64.2 | 0.352 | -42.7 |
| 1600 | 0.309 | -178.5 | 3.464 | 68.5 | 0.133 | 64.0 | 0.346 | -45.1 |
| 1800 | 0.302 | 176.0 | 3.094 | 64.7 | 0.147 | 63.6 | 0.344 | -48.0 |
| 2000 | 0.299 | 170.6 | 2.828 | 61.2 | 0.163 | 63.1 | 0.348 | -50.8 |

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