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| SANYO | No.5034 | 2SC5227 |
| | | NPN Epitaxial Planar Silicon Transistor VHF to UHF Wide-Band Low-Noise Amp Applications |

Features

- Low noise : $NF = 1.0\text{dB typ (} f = 1\text{GHz)}$.
- High gain : $|S_{21e}|^2 = 12\text{dB typ (} f = 1\text{GHz)}$.
- High cutoff frequency : $f_T = 7\text{GHz typ}$.

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

| | | | unit |
|------------------------------|-----------|-------------|------------------|
| Collector-to-Base Voltage | V_{CB0} | 20 | V |
| Collector-to-Emitter Voltage | V_{CEO} | 10 | V |
| Emitter-to-Base Voltage | V_{EBO} | 2 | V |
| Collector Current | I_C | 70 | mA |
| Collector Dissipation | P_C | 200 | 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_{CBO} | $V_{CB} = 10\text{V}, I_E = 0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 1\text{V}, I_C = 0$ | | | 10 | μA |
| DC Current Gain | h_{FE} | $V_{CE} = 5\text{V}, I_C = 20\text{mA}$ | 60* | | 270* | |
| Gain-Bandwidth Product | f_T | $V_{CE} = 5\text{V}, I_C = 20\text{mA}$ | 5 | 7 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ | | 0.75 | 1.2 | pF |
| Reverse Transfer Capacitance | C_{re} | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ | | 0.5 | | pF |
| Forward Transfer Gain | $ S_{21e} ^2(1)$ | $V_{CE} = 5\text{V}, I_C = 20\text{mA}, f = 1\text{GHz}$ | 9 | 12 | | dB |
| | $ S_{21e} ^2(2)$ | $V_{CE} = 2\text{V}, I_C = 3\text{mA}, f = 1\text{GHz}$ | | 8 | | dB |
| Noise Figure | NF | $V_{CE} = 5\text{V}, I_C = 7\text{mA}, f = 1\text{GHz}$ | 1.0 | 1.8 | | dB |

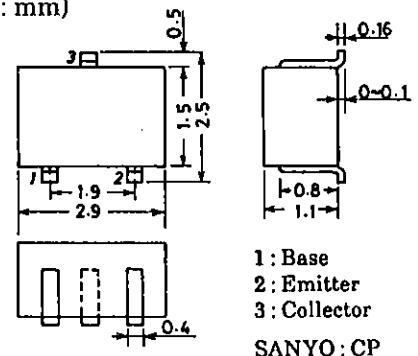
* : The 2SC5227 is classified by 20mA h_{FE} as follows :

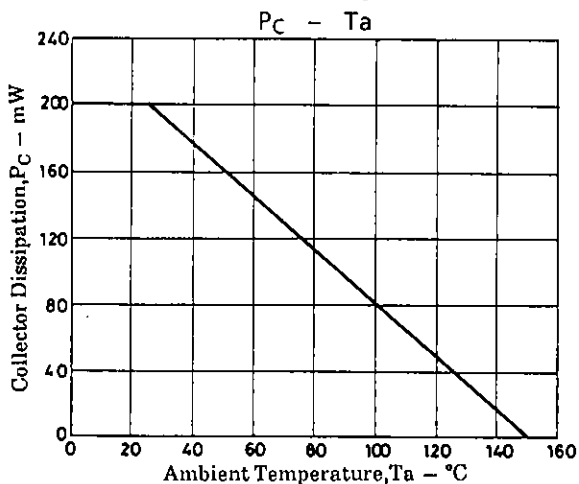
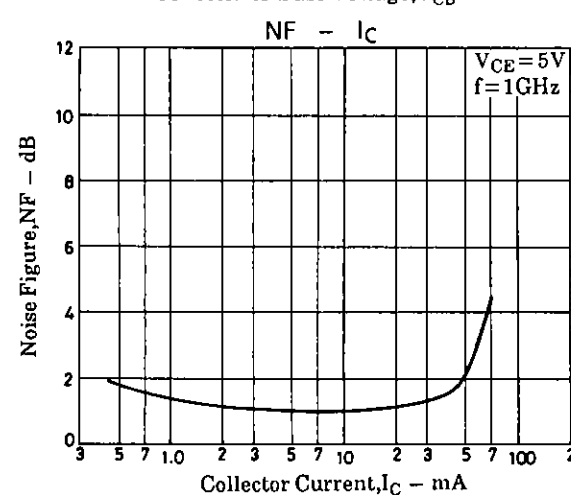
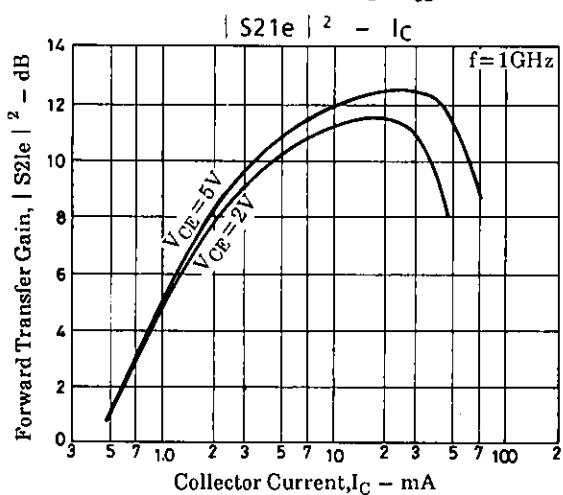
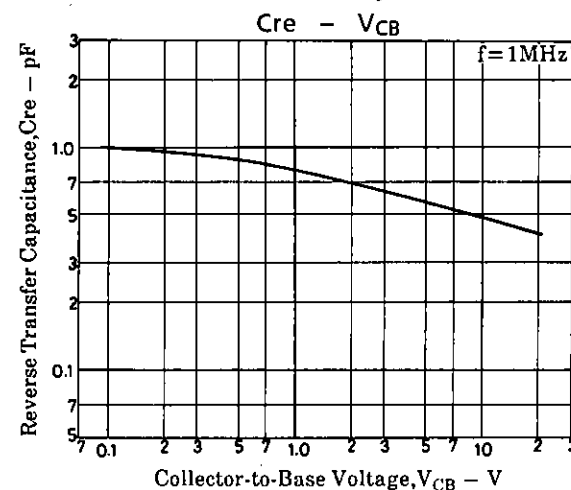
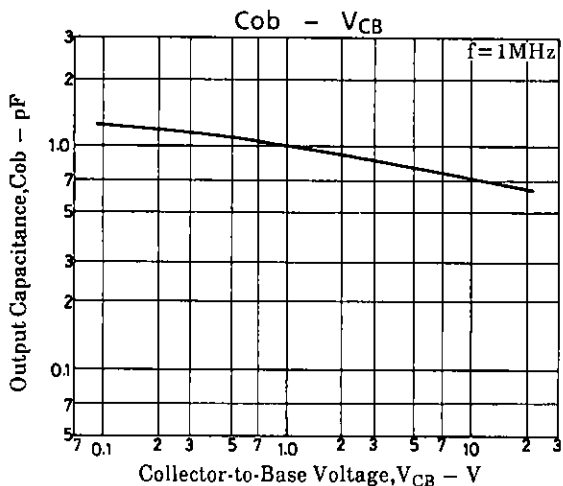
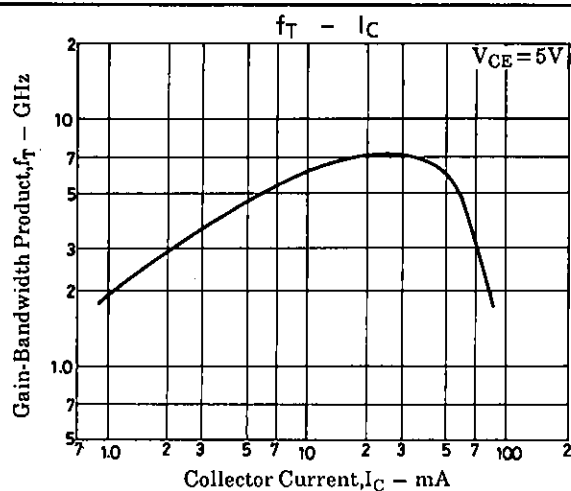
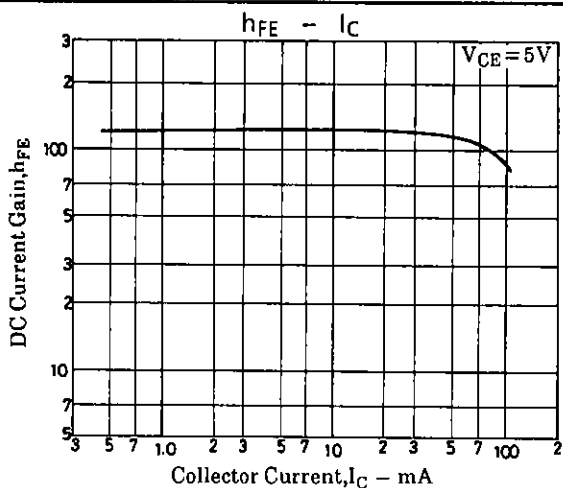
| | | | | | | | | |
|----|---|-----|----|---|-----|-----|---|-----|
| 60 | 3 | 120 | 90 | 4 | 180 | 135 | 5 | 270 |
|----|---|-----|----|---|-----|-----|---|-----|

Marking : LN

h_{FE} rank : 3, 4, 5

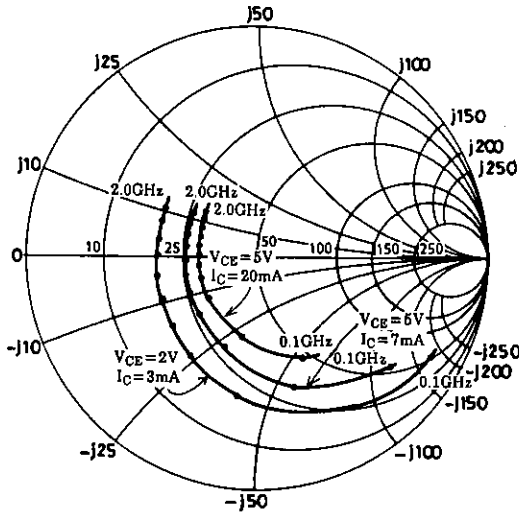
Package Dimensions 2018B
(unit : mm)



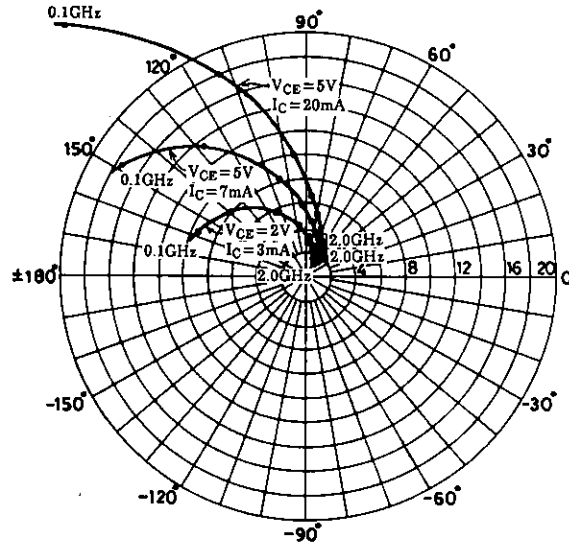


S Parameter

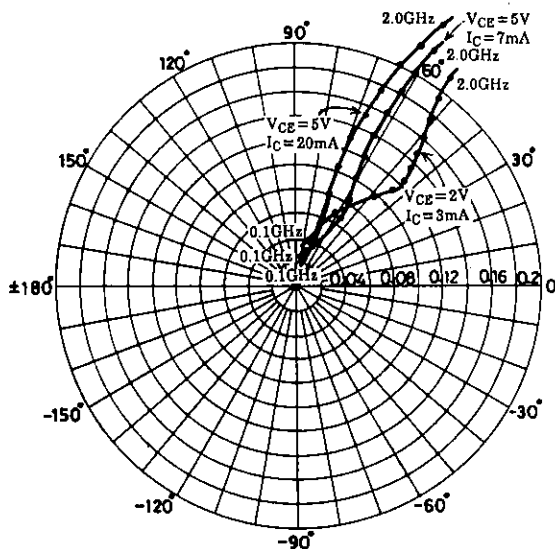
f = 100MHz, 200 to 2000MHz (200MHz step)



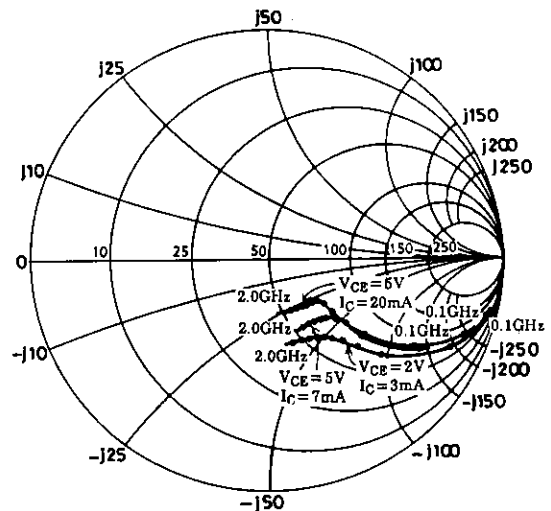
f = 100MHz, 200 to 2000MHz (200MHz step)



f = 100MHz, 200 to 2000MHz (200MHz step)



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S Parameter (Common emitter)

 $V_{CE}=5V, I_C=7mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.722 | -41.6 | 17.352 | 148.7 | 0.029 | 70.9 | 0.883 | -21.3 |
| 200 | 0.587 | -73.2 | 13.419 | 127.6 | 0.046 | 60.8 | 0.710 | -33.1 |
| 400 | 0.426 | -113.0 | 8.371 | 105.1 | 0.067 | 56.9 | 0.507 | -40.7 |
| 600 | 0.369 | -136.6 | 5.914 | 92.7 | 0.084 | 58.4 | 0.423 | -42.5 |
| 800 | 0.344 | -152.9 | 4.593 | 83.9 | 0.102 | 60.3 | 0.382 | -43.9 |
| 1000 | 0.334 | -165.7 | 3.750 | 76.7 | 0.121 | 61.5 | 0.360 | -46.3 |
| 1200 | 0.326 | -177.9 | 3.178 | 70.3 | 0.141 | 62.0 | 0.350 | -49.1 |
| 1400 | 0.324 | 172.3 | 2.784 | 64.9 | 0.162 | 61.8 | 0.341 | -52.2 |
| 1600 | 0.328 | 163.4 | 2.476 | 59.5 | 0.183 | 61.2 | 0.334 | -56.4 |
| 1800 | 0.335 | 154.5 | 2.246 | 54.6 | 0.204 | 60.5 | 0.328 | -60.8 |
| 2000 | 0.346 | 147.5 | 3.073 | 50.0 | 0.226 | 59.6 | 0.328 | -65.4 |

 $V_{CE}=5V, I_C=20mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.477 | -66.8 | 28.090 | 133.6 | 0.022 | 67.7 | 0.726 | -32.7 |
| 200 | 0.358 | -104.1 | 17.995 | 112.9 | 0.035 | 65.3 | 0.506 | -41.6 |
| 400 | 0.288 | -142.2 | 9.903 | 95.9 | 0.057 | 68.3 | 0.350 | -42.4 |
| 600 | 0.273 | -159.8 | 6.777 | 86.7 | 0.081 | 69.9 | 0.299 | -41.8 |
| 800 | 0.270 | -171.7 | 5.181 | 79.9 | 0.104 | 70.2 | 0.278 | -43.2 |
| 1000 | 0.271 | 178.7 | 4.209 | 73.9 | 0.129 | 69.1 | 0.269 | -45.9 |
| 1200 | 0.273 | 169.4 | 3.554 | 68.5 | 0.153 | 67.9 | 0.264 | -49.6 |
| 1400 | 0.275 | 161.1 | 3.085 | 63.6 | 0.177 | 66.2 | 0.258 | -53.3 |
| 1600 | 0.284 | 153.4 | 2.749 | 59.1 | 0.202 | 64.3 | 0.253 | -58.3 |
| 1800 | 0.294 | 145.6 | 2.479 | 54.6 | 0.224 | 62.5 | 0.249 | -63.4 |
| 2000 | 0.302 | 140.8 | 2.295 | 50.6 | 0.248 | 60.4 | 0.248 | -68.7 |

 $V_{CE}=2V, I_C=3mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.858 | -30.5 | 9.283 | 157.3 | 0.039 | 73.6 | 0.944 | -15.6 |
| 200 | 0.769 | -57.4 | 8.036 | 138.7 | 0.068 | 61.4 | 0.834 | -27.5 |
| 400 | 0.607 | -97.1 | 5.756 | 113.9 | 0.099 | 48.4 | 0.641 | -40.5 |
| 600 | 0.528 | -123.2 | 4.302 | 98.1 | 0.114 | 44.4 | 0.525 | -46.5 |
| 800 | 0.486 | -141.6 | 3.414 | 87.0 | 0.125 | 43.9 | 0.465 | -50.2 |
| 1000 | 0.460 | -156.4 | 2.834 | 78.0 | 0.137 | 45.4 | 0.429 | -53.7 |
| 1200 | 0.453 | -169.4 | 2.429 | 70.3 | 0.149 | 47.5 | 0.408 | -57.3 |
| 1400 | 0.440 | 179.8 | 2.143 | 63.6 | 0.163 | 49.2 | 0.395 | -60.9 |
| 1600 | 0.441 | 170.1 | 1.919 | 57.4 | 0.179 | 50.8 | 0.385 | -65.4 |
| 1800 | 0.447 | 160.4 | 1.739 | 51.7 | 0.196 | 52.3 | 0.381 | -70.1 |
| 2000 | 0.454 | 152.5 | 1.621 | 46.4 | 0.215 | 53.3 | 0.379 | -75.2 |