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|--------------|---------|---|
| SANYO | No.5032 | 2SC5226 |
| | | 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_{CE0} | 10 | V |
| Emitter-to-Base Voltage | V_{EB0} | 2 | V |
| Collector Current | I_C | 70 | mA |
| Collector Dissipation | P_C | 150 | mW |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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

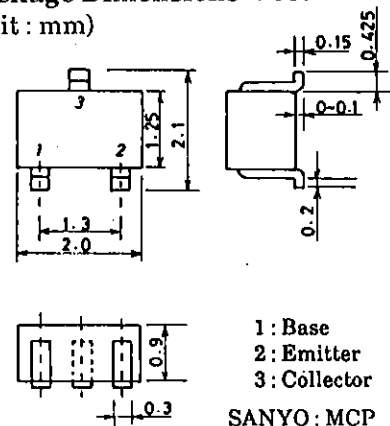
| | | | min | typ | max | unit |
|------------------------------|------------------|--|-----|------|------|---------------|
| Collector Cutoff Current | I_{CBO} | $V_{CB} = 10\text{V}, I_E = 0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 1\text{V}, I_C = 0$ | | | 10 | μA |
| DC Current 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 |

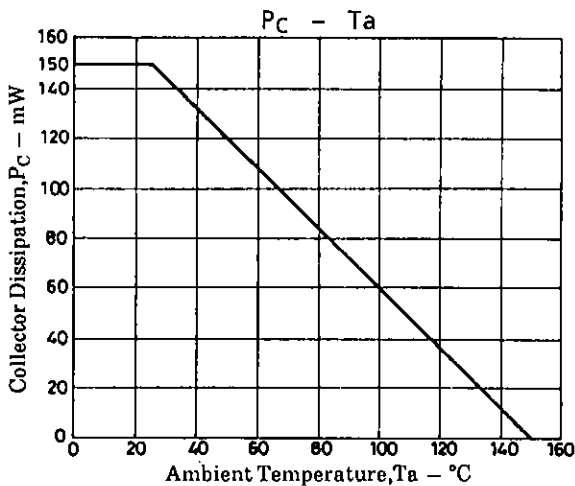
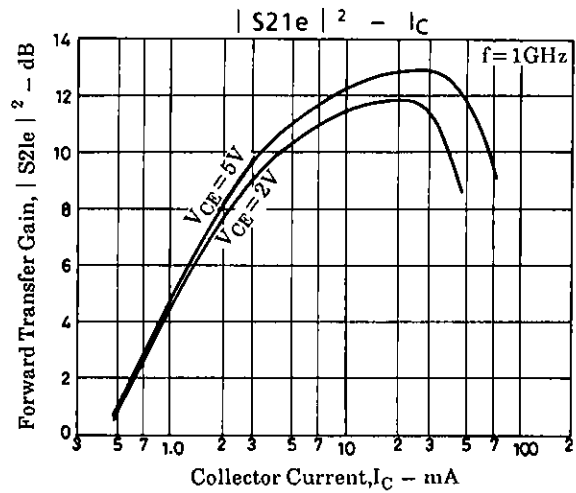
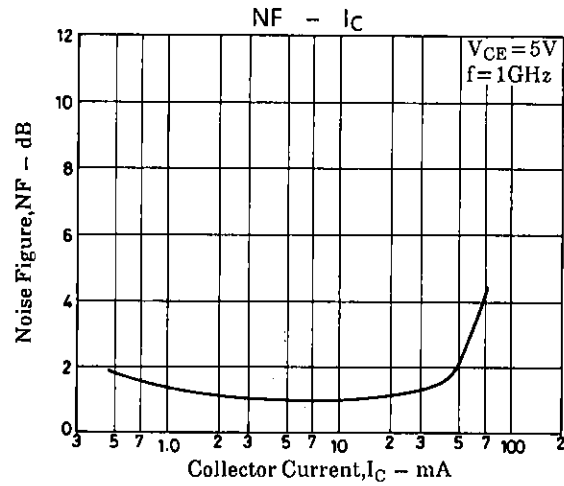
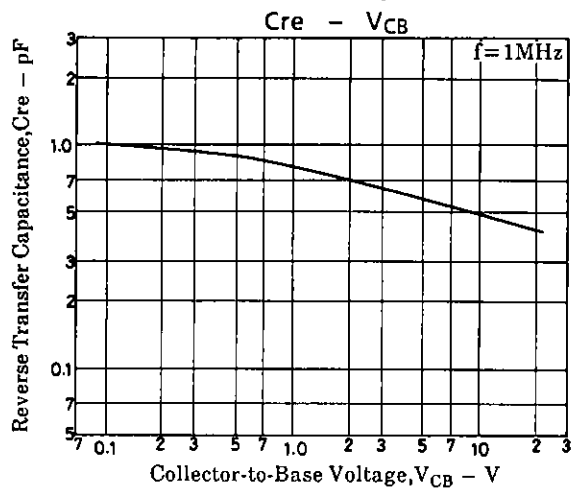
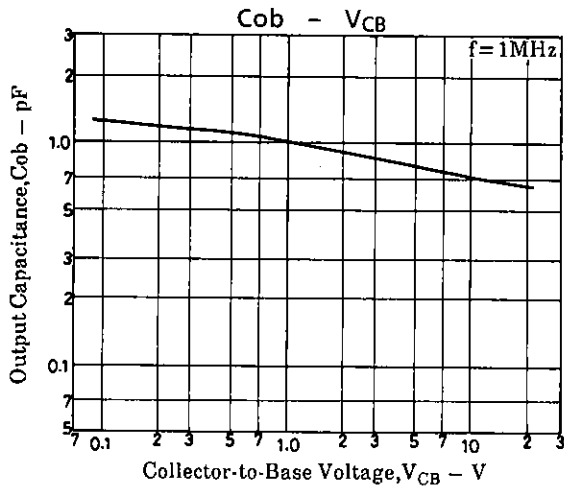
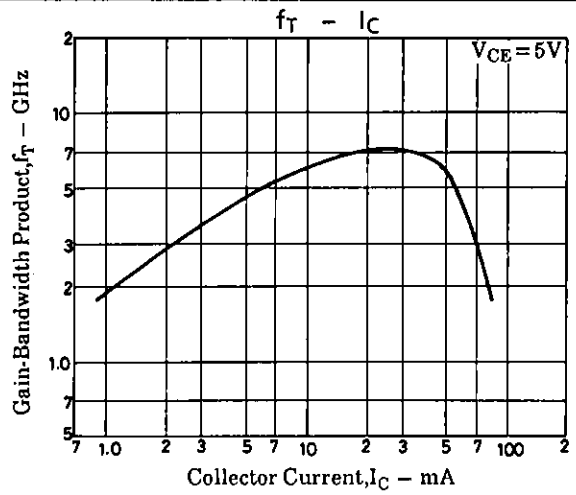
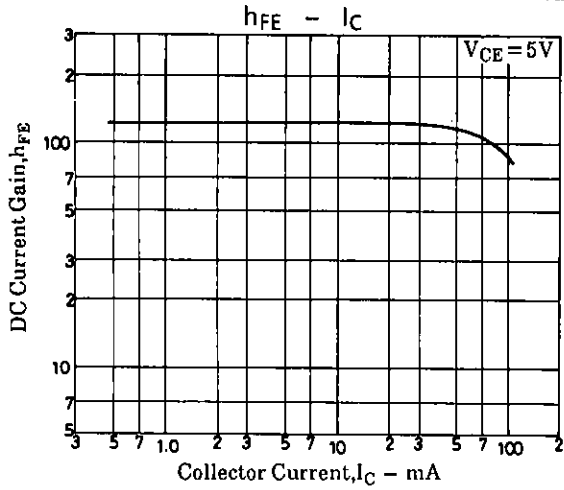
* : The 2SC5226 is classified by 20mA h_{FE} as follows :

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

Marking : LN
 h_{FE} rank : 3, 4, 5

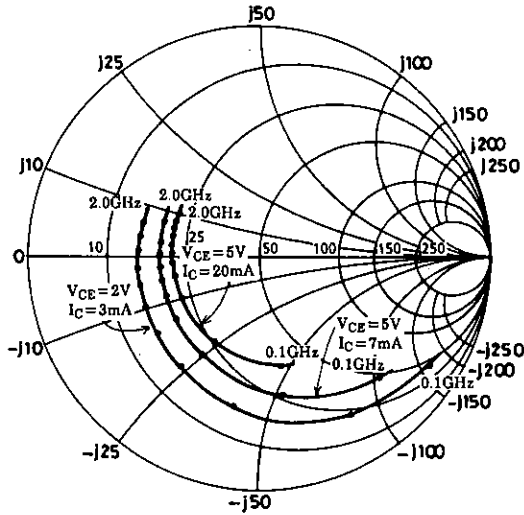
Package Dimensions 2059A
(unit : mm)



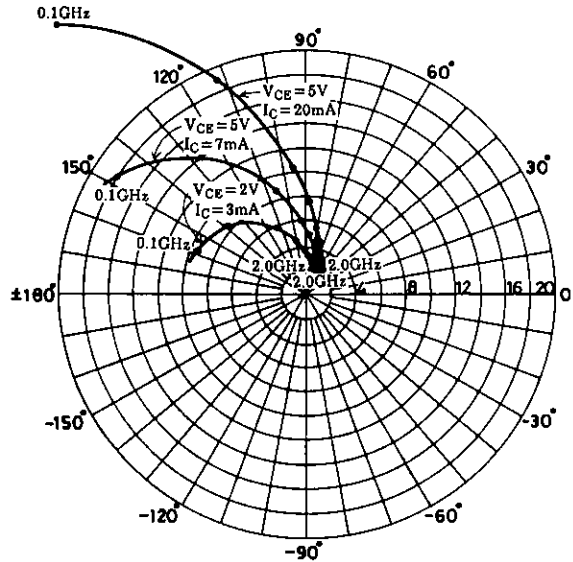


S Parameter

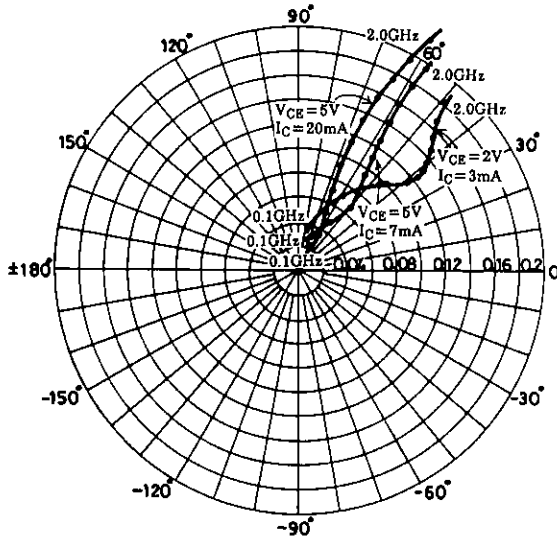
f = 100MHz, 200 to 2000MHz (200MHz step)



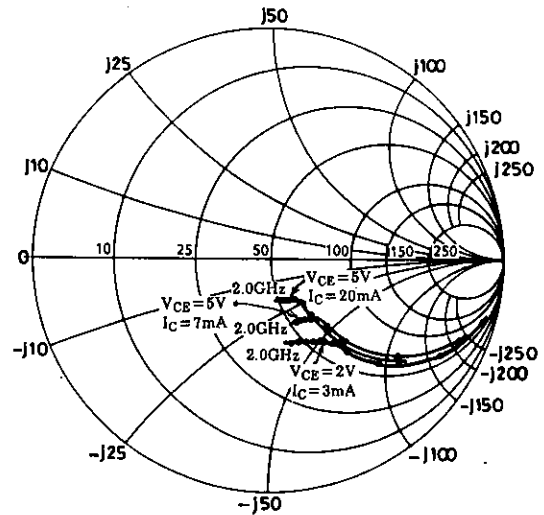
f = 100MHz, 200 to 2000MHz (200MHz step)



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



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 | 0.720 | -46.0 | 17.973 | 148.5 | 0.030 | 68.5 | 0.880 | -23.6 |
| 200 | 0.612 | -80.9 | 13.927 | 127.3 | 0.047 | 57.1 | 0.697 | -37.6 |
| 400 | 0.497 | -121.3 | 8.656 | 105.0 | 0.066 | 51.3 | 0.479 | -47.6 |
| 600 | 0.456 | -143.5 | 6.080 | 92.8 | 0.079 | 52.9 | 0.382 | -50.5 |
| 800 | 0.440 | -157.6 | 4.725 | 84.3 | 0.094 | 55.4 | 0.339 | -51.8 |
| 1000 | 0.436 | -167.5 | 3.864 | 77.0 | 0.110 | 56.8 | 0.323 | -53.4 |
| 1200 | 0.434 | -176.1 | 3.258 | 70.3 | 0.126 | 57.9 | 0.312 | -55.8 |
| 1400 | 0.433 | 176.6 | 2.847 | 64.5 | 0.143 | 58.4 | 0.304 | -58.3 |
| 1600 | 0.433 | 170.9 | 2.329 | 57.4 | 0.160 | 58.9 | 0.296 | -62.0 |
| 1800 | 0.434 | 165.0 | 2.252 | 54.2 | 0.178 | 58.6 | 0.293 | -65.0 |
| 2000 | 0.439 | 159.6 | 2.057 | 49.2 | 0.197 | 58.1 | 0.294 | -68.1 |

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

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.481 | -78.8 | 29.795 | 132.9 | 0.022 | 63.9 | 0.707 | -38.2 |
| 200 | 0.420 | -119.2 | 19.008 | 112.2 | 0.033 | 60.8 | 0.470 | -51.1 |
| 400 | 0.391 | -151.6 | 10.416 | 95.4 | 0.052 | 64.7 | 0.296 | -55.3 |
| 600 | 0.386 | -166.4 | 7.084 | 86.6 | 0.071 | 67.2 | 0.236 | -56.1 |
| 800 | 0.381 | -175.9 | 5.407 | 80.1 | 0.092 | 68.4 | 0.213 | -56.6 |
| 1000 | 0.382 | 178.2 | 4.401 | 74.1 | 0.114 | 67.8 | 0.208 | -57.9 |
| 1200 | 0.385 | 172.1 | 3.701 | 68.5 | 0.134 | 66.8 | 0.204 | -60.7 |
| 1400 | 0.388 | 166.7 | 3.217 | 63.6 | 0.156 | 65.6 | 0.202 | -63.5 |
| 1600 | 0.390 | 162.1 | 2.839 | 58.8 | 0.176 | 64.0 | 0.199 | -67.9 |
| 1800 | 0.391 | 156.7 | 2.534 | 54.3 | 0.197 | 62.4 | 0.197 | -71.2 |
| 2000 | 0.394 | 152.1 | 2.319 | 50.1 | 0.219 | 60.6 | 0.197 | -74.2 |

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

| 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 | -32.4 | 9.413 | 157.2 | 0.040 | 72.6 | 0.945 | -16.5 |
| 200 | 0.782 | -60.7 | 8.187 | 138.5 | 0.070 | 59.2 | 0.833 | -29.3 |
| 400 | 0.653 | -101.1 | 5.855 | 113.8 | 0.101 | 44.5 | 0.637 | -43.2 |
| 600 | 0.588 | -126.5 | 4.337 | 98.4 | 0.114 | 39.1 | 0.515 | -50.0 |
| 800 | 0.557 | -143.7 | 3.444 | 87.7 | 0.122 | 38.0 | 0.454 | -53.8 |
| 1000 | 0.543 | -156.3 | 2.871 | 78.5 | 0.130 | 38.6 | 0.426 | -57.1 |
| 1200 | 0.536 | -166.8 | 2.446 | 70.5 | 0.137 | 40.3 | 0.407 | -60.3 |
| 1400 | 0.533 | -175.5 | 2.145 | 63.5 | 0.146 | 42.5 | 0.393 | -63.8 |
| 1600 | 0.527 | 177.0 | 1.904 | 57.1 | 0.155 | 45.0 | 0.382 | -68.0 |
| 1800 | 0.525 | 170.3 | 1.714 | 51.7 | 0.168 | 47.3 | 0.379 | -72.0 |
| 2000 | 0.528 | 163.8 | 1.564 | 45.9 | 0.183 | 49.2 | 0.378 | -75.8 |