



SANYO Semiconductors DATA SHEET

2SC5226A — NPN Epitaxial Planar Silicon Transistor VHF to UHF Wide-Band Low-Noise Amplifier Applications

Features

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

Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|------------------|------------|-------------|------|
| Collector-to-Base Voltage | V _{CBO} | | 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 | | 150 | mW |
| Junction Temperature | T _J | | 150 | °C |
| Storage Temperature | T _{stg} | | -55 to +150 | °C |

Electrical Characteristics at Ta=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--------------------------|------------------|---|---------|-----|------|------|
| | | | min | typ | max | |
| Collector Cutoff Current | I _{CBO} | V _{CB} =10V, I _E =0A | | | 1.0 | μA |
| Emitter Cutoff Current | I _{EBO} | V _{EB} =1V, I _C =0A | | | 10 | μA |
| DC Current Gain | h _{FE} | V _{CE} =5V, I _C =20mA | 60* | | 270* | |

Continued on next page.

* : The 2SC5226A is classified by 20mA hFE as follows :

| Marking | LN3 | LN4 | LN5 |
|-----------------|-----------|-----------|------------|
| Rank | 3 | 4 | 5 |
| h _{FE} | 60 to 120 | 90 to 180 | 135 to 270 |

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SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

51408AB TI IM TC-00001340 No. A1062-1/6

2SC5226A

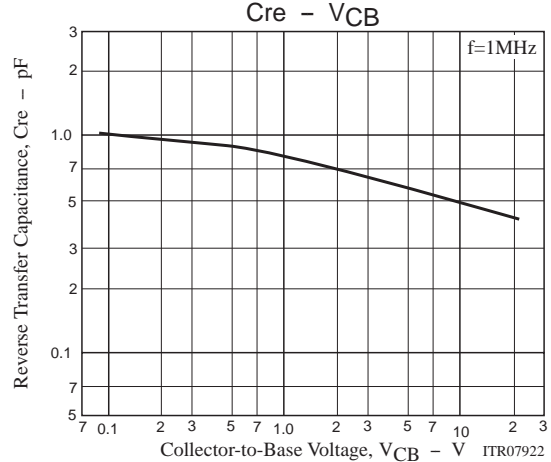
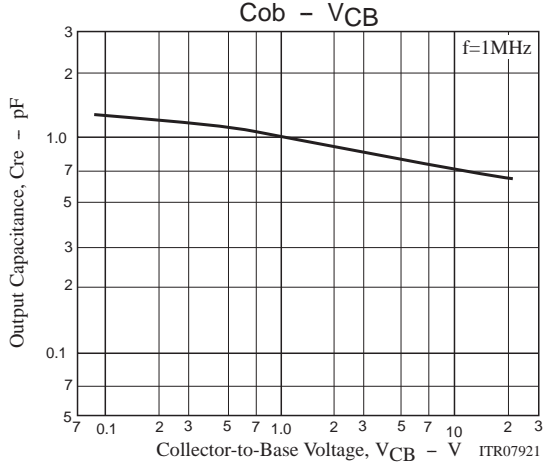
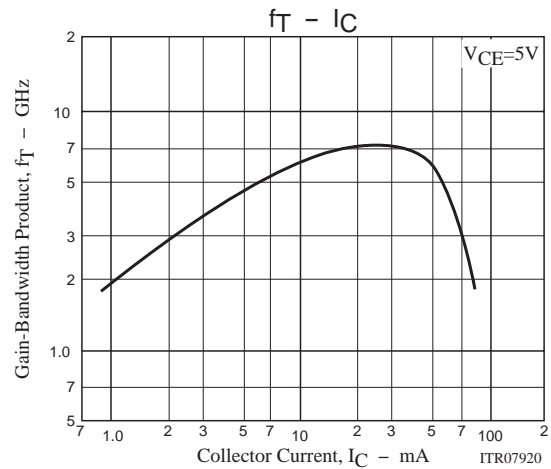
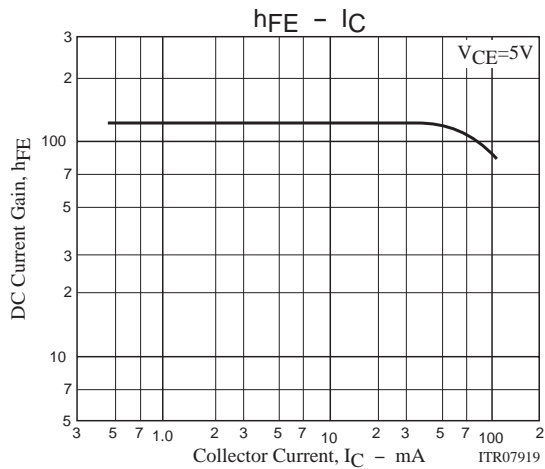
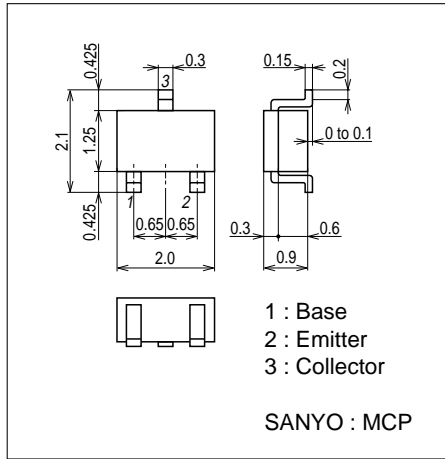
Continued from preceding page.

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|------------------------------|------------------|-------------------------------|---------|------|-----|------|
| | | | min | typ | max | |
| Gain-Bandwidth Product | f_T | $V_{CE}=5V, I_C=20mA$ | 5 | 7 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB}=10V, f=1MHz$ | | 0.75 | 1.2 | pF |
| Reverse Transfer Capacitance | C_{re} | $V_{CB}=10V, f=1MHz$ | | 0.5 | | pF |
| Forward Transfer Gain | $ S_{21e} ^{21}$ | $V_{CE}=5V, I_C=20mA, f=1GHz$ | 9 | 12 | | dB |
| | $ S_{21e} ^{22}$ | $V_{CE}=2V, I_C=3mA, f=1GHz$ | | 8 | | dB |
| Noise Figure | NF | $V_{CE}=5V, I_C=7mA, f=1GHz$ | | 1.0 | 1.8 | dB |

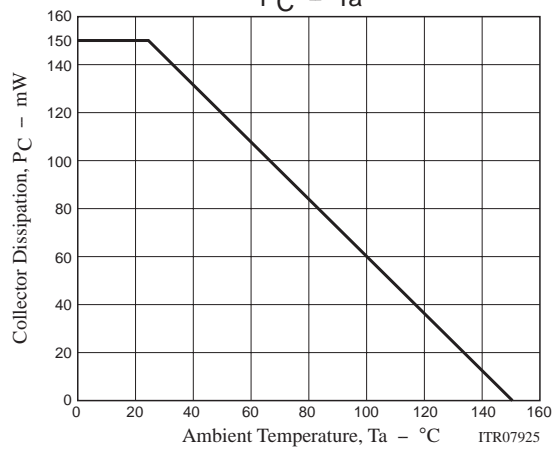
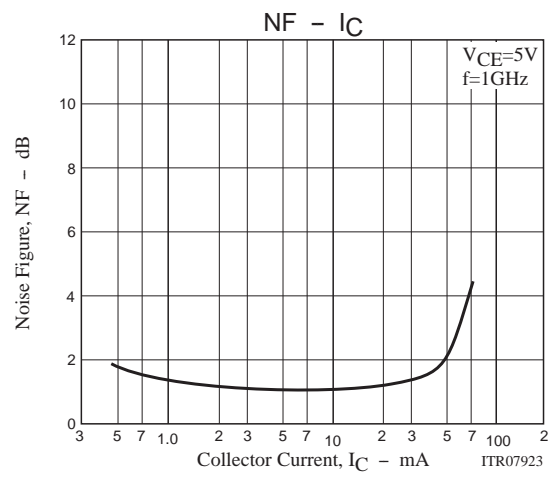
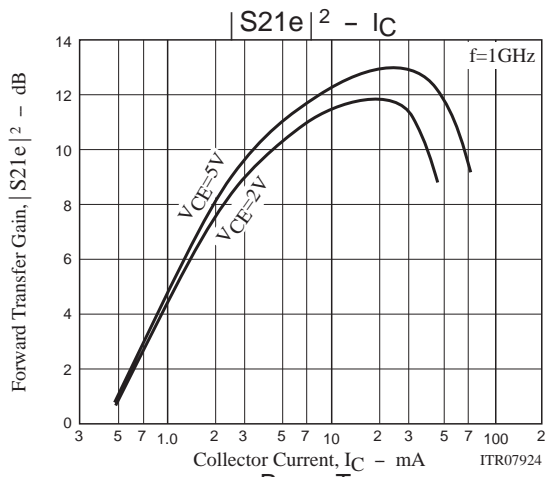
Package Dimensions

unit : mm (typ)

7023-009



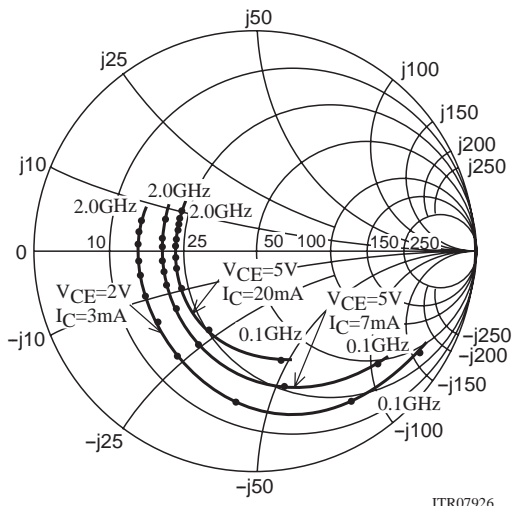
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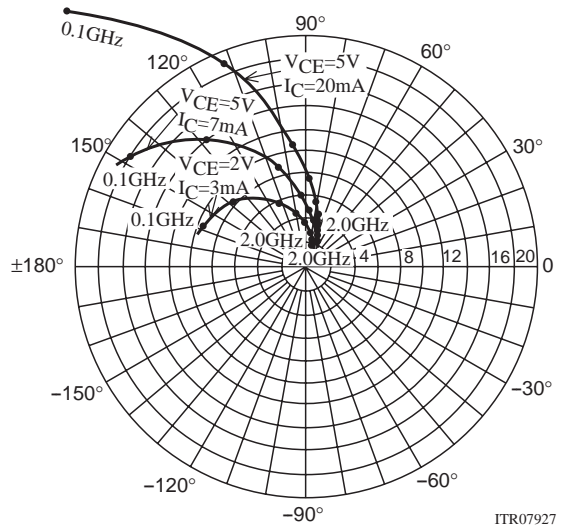
S Parameters

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



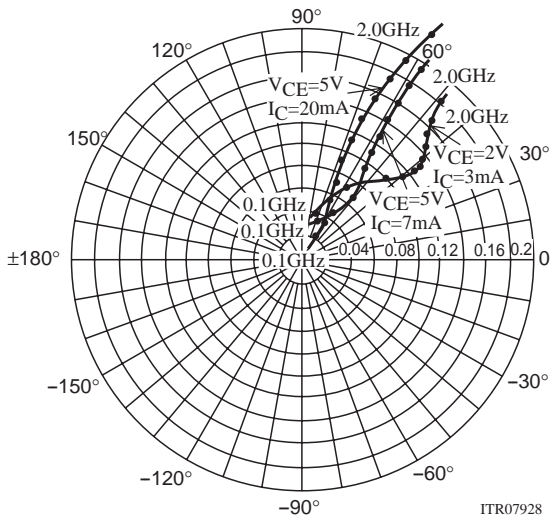
ITR07926

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



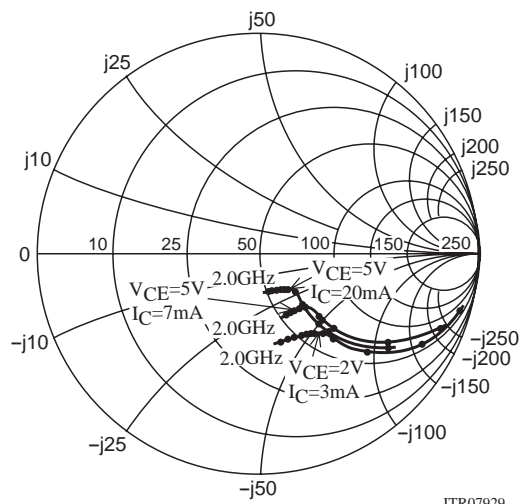
ITR07927

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



ITR07928

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



ITR07929

2SC5226A

S Parameters (Common emitter)

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

| 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 |

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

| 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 |

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

| 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 |

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