

| | | |
|--------------|---------|---|
| SANYO | No.4857 | 2SC4871 |
| | | NPN Epitaxial Planar Silicon Transistor UHF to S Band Low-Noise Amp, OSC Applications |

Features

- High cutoff frequency : $f_T = 10\text{GHz typ.}$
- High gain : $|S_{21e}|^2 = 13\text{dB typ (f=1GHz)}$
- Low noise : $NF = 1.3\text{dB typ (f=1GHz)}$
- Small Cob : $C_{ob} = 0.4\text{pF typ.}$

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 | 20 | 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 $T_a = 25^\circ\text{C}$

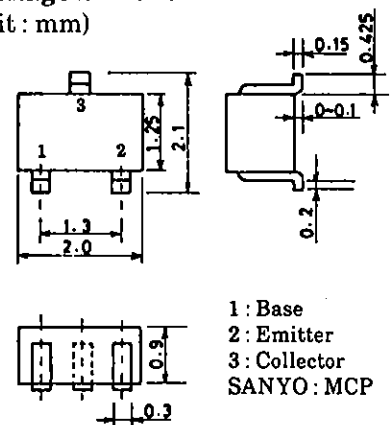
| | | | min | typ | max | unit |
|--------------------------|---------------|---|-----|-----|------|---------------|
| Collector Cutoff Current | I_{CB0} | $V_{CB} = 10\text{V}, I_E = 0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 1\text{V}, I_C = 0$ | | | 10 | μA |
| DC Current Gain | h_{FE} | $V_{CE} = 5\text{V}, I_C = 4\text{mA}$ | 60* | | 270* | |
| Gain-Bandwidth Product | f_T | $V_{CE} = 5\text{V}, I_C = 4\text{mA}$ | | 10 | | GHz |
| Output Capacitance | Cob | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ | | 0.4 | 0.7 | pF |
| Forward Transfer Gain | $ S_{21e} ^2$ | $V_{CE} = 5\text{V}, I_C = 7\text{mA}, f = 1\text{GHz}$ | 10 | 13 | | dB |
| Noise Figure | NF | $V_{CE} = 5\text{V}, I_C = 4\text{mA}, f = 1\text{GHz}$ | | 1.3 | 2.8 | dB |

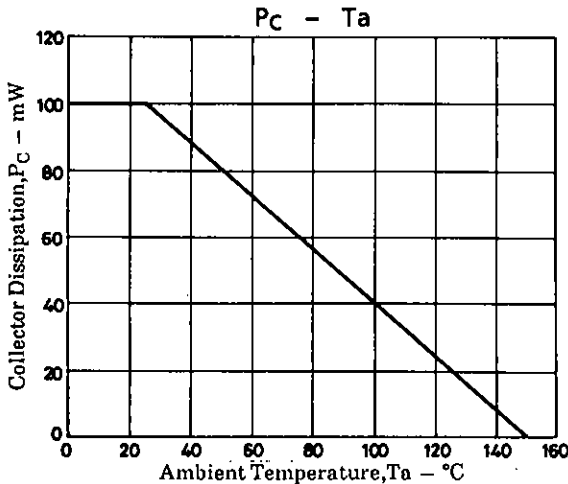
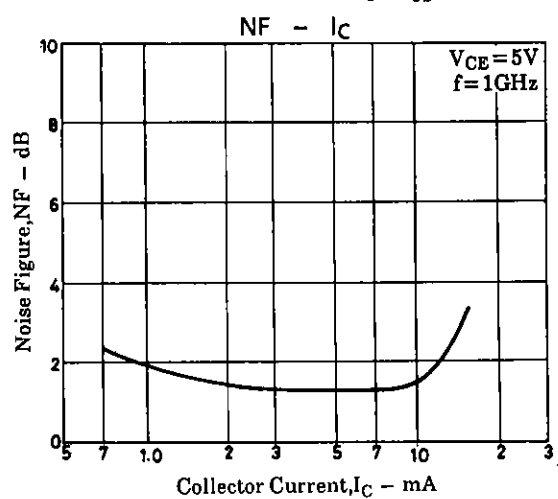
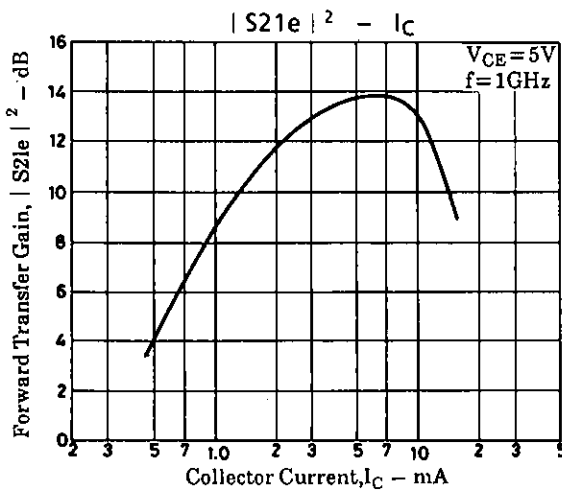
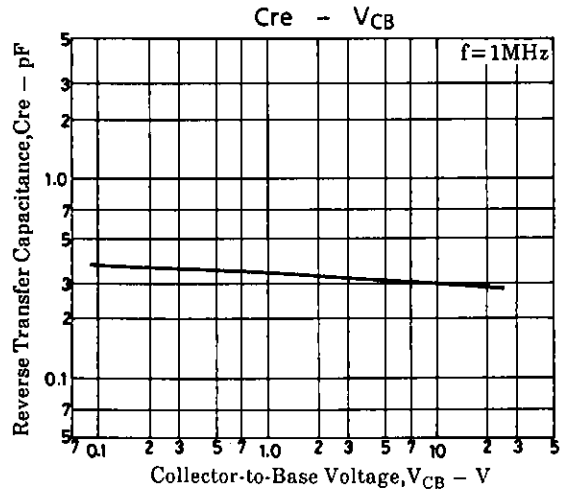
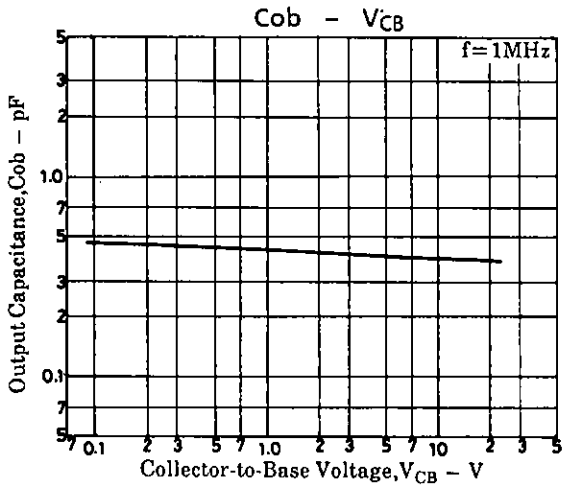
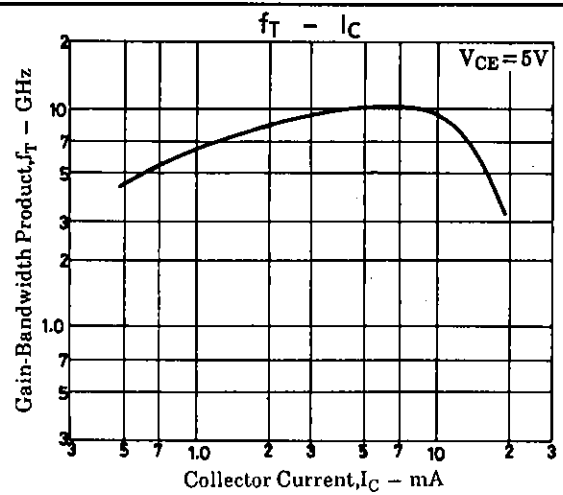
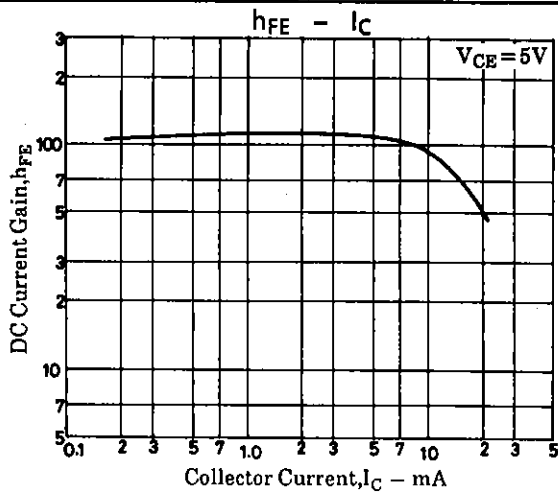
* : The 2SC4871 is classified by 4mA h_{FE} as follows :

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

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

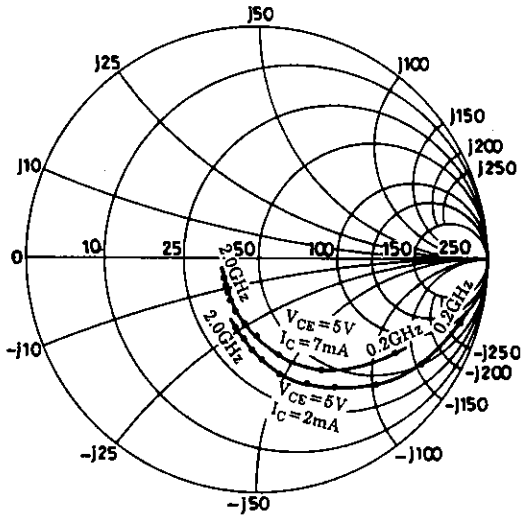
Package Dimensions 2059A
(unit: mm)



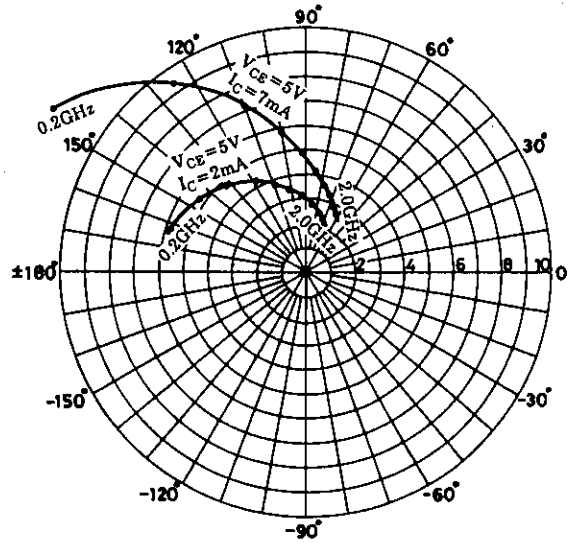


S Parameter

f = 200 to 2000MHz (200MHz Step)

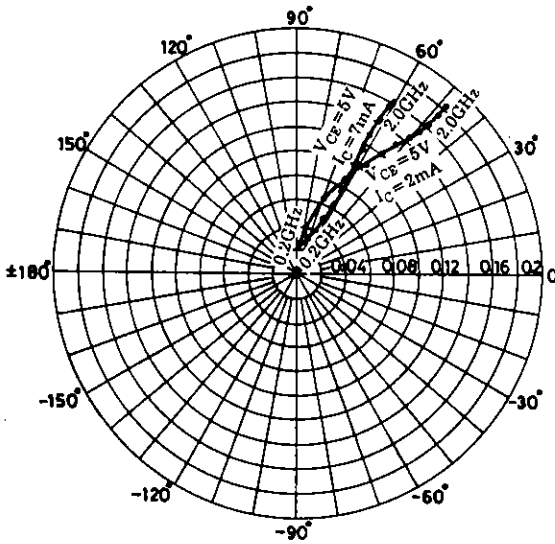


f = 200 to 2000MHz (200MHz Step)

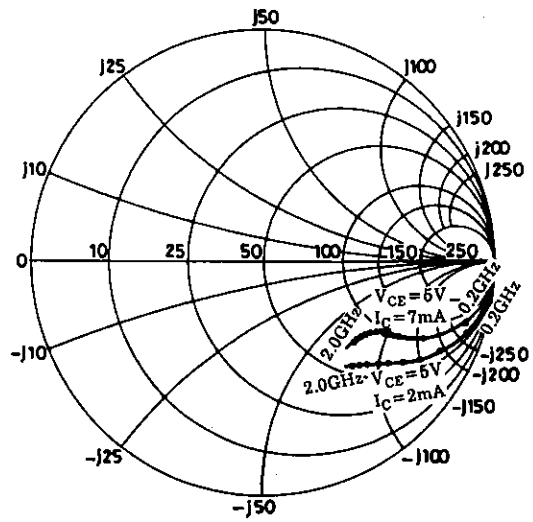


V_{CE} = 5V

f = 200 to 2000MHz (200MHz Step)



f = 200 to 2000MHz (200MHz Step)



S Parameter (Common emitter)

 $V_{CE}=5V, I_C=2mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.912 | -17.6 | 5.764 | 161.5 | 0.034 | 79.0 | 0.974 | -10.3 |
| 400 | 0.835 | -33.0 | 5.282 | 145.5 | 0.065 | 69.9 | 0.919 | -19.2 |
| 600 | 0.742 | -46.9 | 4.753 | 131.2 | 0.088 | 62.8 | 0.850 | -26.3 |
| 800 | 0.649 | -58.9 | 4.268 | 119.4 | 0.107 | 57.9 | 0.789 | -31.6 |
| 1000 | 0.578 | -68.7 | 3.840 | 109.4 | 0.121 | 54.5 | 0.740 | -35.5 |
| 1200 | 0.512 | -78.1 | 3.440 | 100.5 | 0.134 | 52.2 | 0.698 | -38.9 |
| 1400 | 0.445 | -86.3 | 3.123 | 92.5 | 0.145 | 50.3 | 0.664 | -41.6 |
| 1600 | 0.400 | -93.0 | 2.836 | 85.2 | 0.154 | 49.2 | 0.638 | -44.3 |
| 1800 | 0.359 | -98.5 | 2.588 | 79.0 | 0.164 | 48.4 | 0.615 | -46.3 |
| 2000 | 0.319 | -106.6 | 2.397 | 73.0 | 0.174 | 47.9 | 0.601 | -48.3 |

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

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.721 | -35.1 | 12.262 | 147.1 | 0.030 | 72.8 | 0.900 | -16.9 |
| 400 | 0.555 | -59.9 | 9.445 | 124.9 | 0.050 | 64.4 | 0.763 | -25.6 |
| 600 | 0.428 | -77.5 | 7.290 | 110.2 | 0.065 | 61.9 | 0.666 | -29.3 |
| 800 | 0.344 | -89.9 | 5.877 | 100.1 | 0.078 | 61.5 | 0.611 | -31.1 |
| 1000 | 0.291 | -100.6 | 4.911 | 92.1 | 0.091 | 61.7 | 0.583 | -32.5 |
| 1200 | 0.254 | -110.9 | 4.223 | 85.1 | 0.104 | 61.5 | 0.563 | -34.1 |
| 1400 | 0.221 | -121.4 | 3.703 | 79.0 | 0.117 | 61.6 | 0.551 | -35.7 |
| 1600 | 0.197 | -128.9 | 3.294 | 73.6 | 0.129 | 61.6 | 0.540 | -37.8 |
| 1800 | 0.178 | -136.7 | 2.946 | 68.5 | 0.143 | 61.1 | 0.530 | -39.7 |
| 2000 | 0.171 | -148.6 | 2.692 | 63.8 | 0.157 | 60.7 | 0.529 | -41.7 |

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