

**2SC4853**

Low-Voltage, Low-Current High-Frequency Amplifier Applications

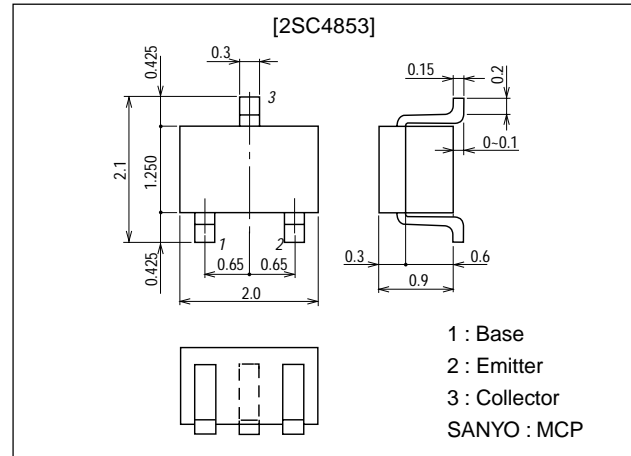
Features

- Low-voltage, low-current operation : $f_T=5\text{GHz}$ typ.
($V_{CE}=1\text{V}$, $I_C=1\text{mA}$) : $|S_{21e}|^2=7\text{dB}$ typ ($f=1\text{GHz}$).
: $NF=2.6\text{dB}$ typ ($f=1\text{GHz}$).

Package Dimensions

unit:mm

2059B



Specifications

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

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|-----------|------------|-------------|------------------|
| Collector-to-Base Voltage | V_{CBO} | | 12 | V |
| Collector-to-Emitter Voltage | V_{CEO} | | 6 | V |
| Emitter-to-Base Voltage | V_{EBO} | | 1.5 | V |
| Collector Current | I_C | | 15 | mA |
| Collector Dissipation | P_C | | 80 | mW |
| Junction Temperature | T_J | | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

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

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--------------------------|-----------|---------------------------------------|---------|-----|------|---------------|
| | | | min | typ | max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB}=5\text{V}$, $I_E=0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB}=1\text{V}$, $I_C=0$ | | | 10 | μA |
| DC Current Gain | h_{FE} | $V_{CE}=1\text{V}$, $I_C=1\text{mA}$ | 60* | | 270* | |
| Gain-Bandwidth Product | f_T | $V_{CE}=1\text{V}$, $I_C=1\text{mA}$ | | 5 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB}=1\text{V}$, $f=1\text{MHz}$ | | 0.6 | 1.0 | pF |

* : The 2SC4853 is classified by 1mA h_{FE} as follows :

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

Marking : CN

h_{FE} rank : 3, 4, 5

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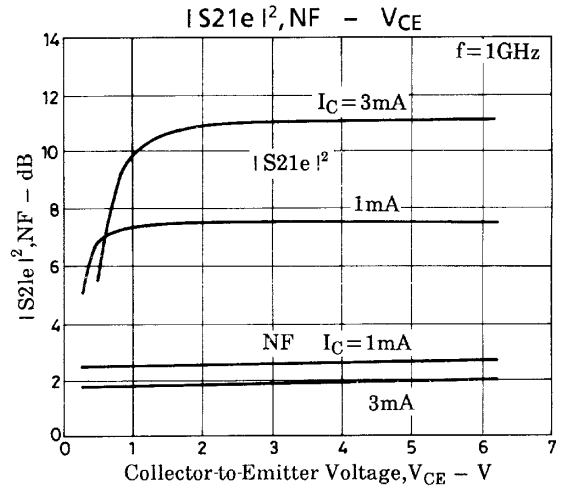
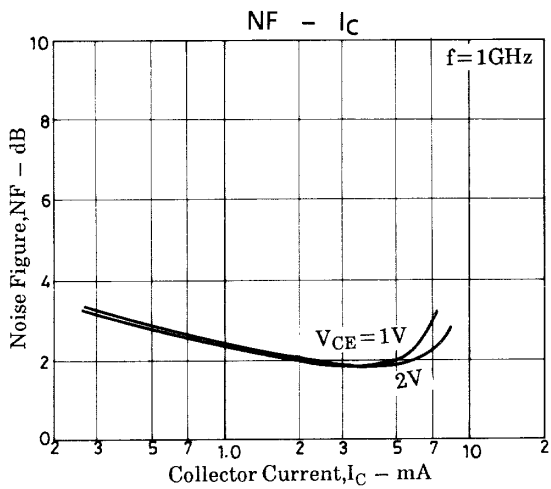
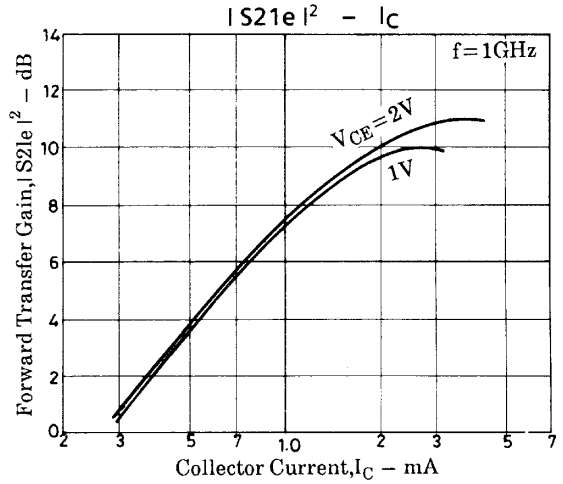
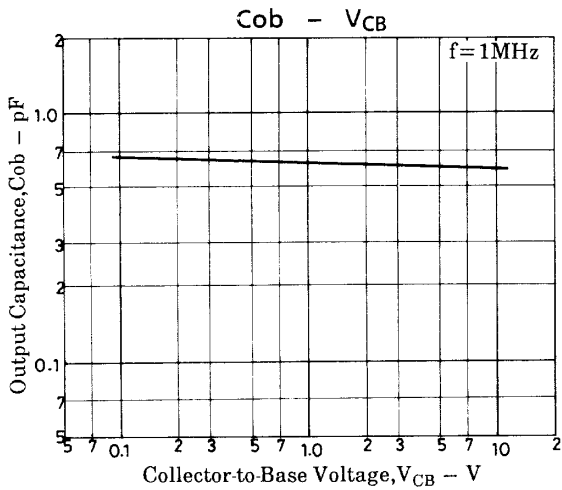
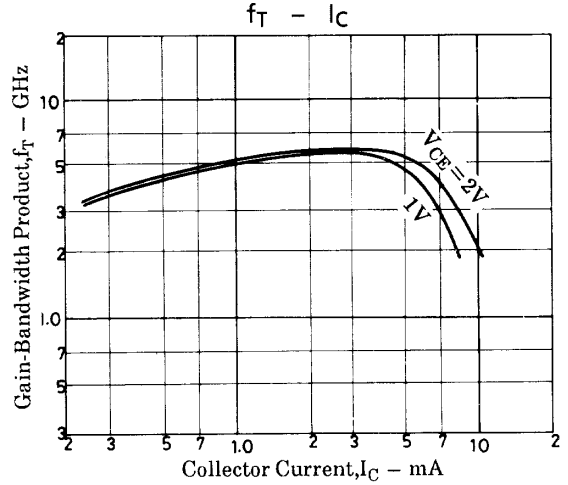
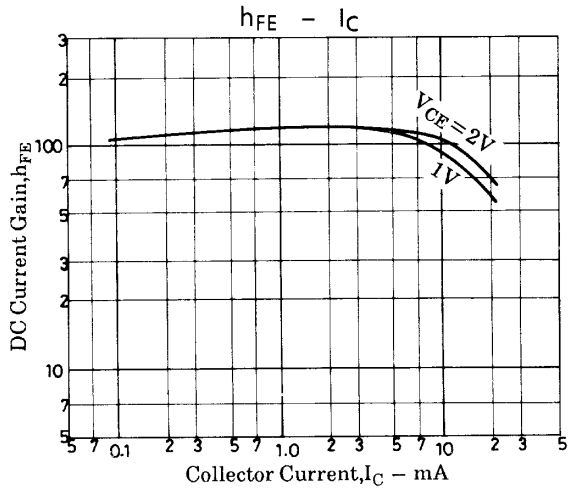
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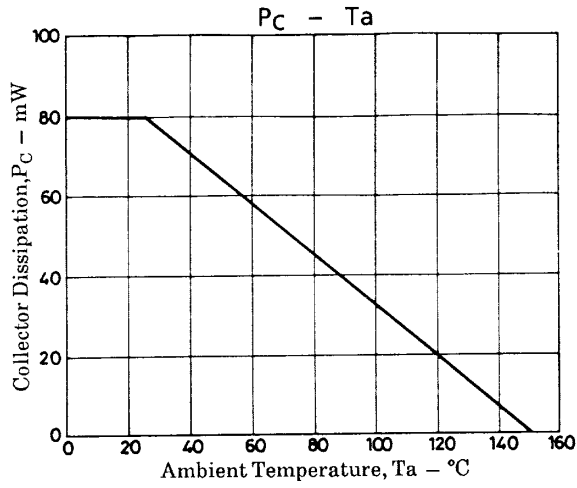
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2SC4853

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|-----------------------|-----------------|------------------------------|---------|------|-----|------|
| | | | min | typ | max | |
| Forward Transfer Gain | $ S_{21e} ^2 1$ | $V_{CE}=1V, I_C=1mA, f=1GHz$ | 4.5 | 7 | | dB |
| | $ S_{21e} ^2 2$ | $V_{CE}=2V, I_C=3mA, f=1GHz$ | | 10.5 | | dB |
| Noise Figure | NF1 | $V_{CE}=1V, I_C=1mA, f=1GHz$ | | 2.6 | 4.5 | dB |
| | NF2 | $V_{CE}=2V, I_C=3mA, f=1GHz$ | | 1.9 | | dB |

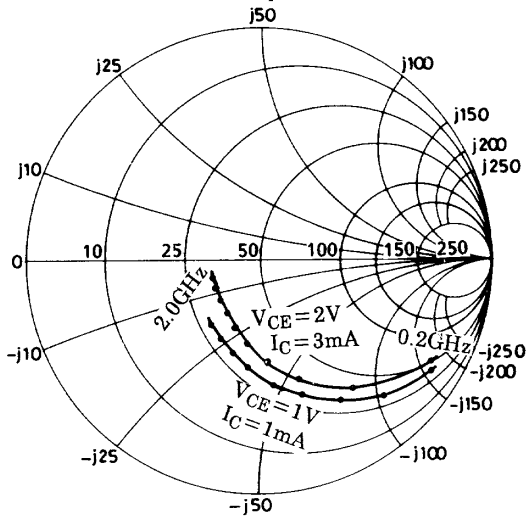


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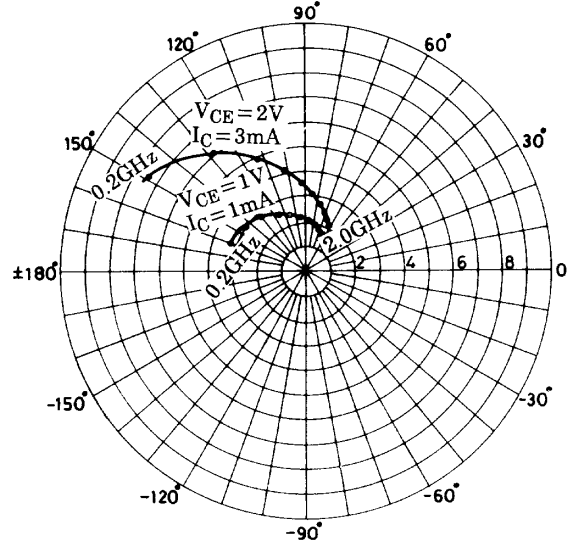


S parameter

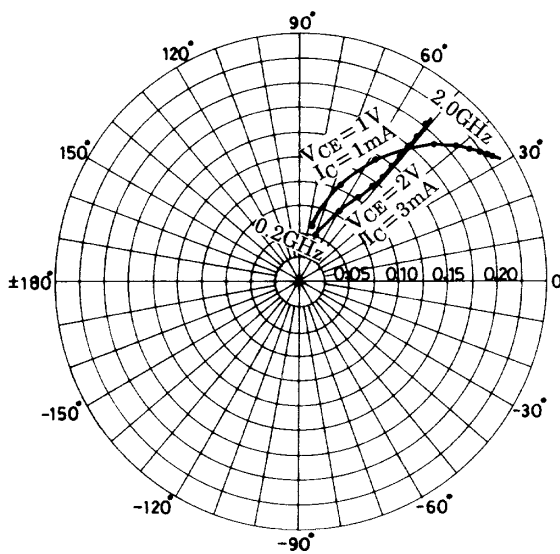
S11e
f = 200 to 2000MHz (200MHz step)



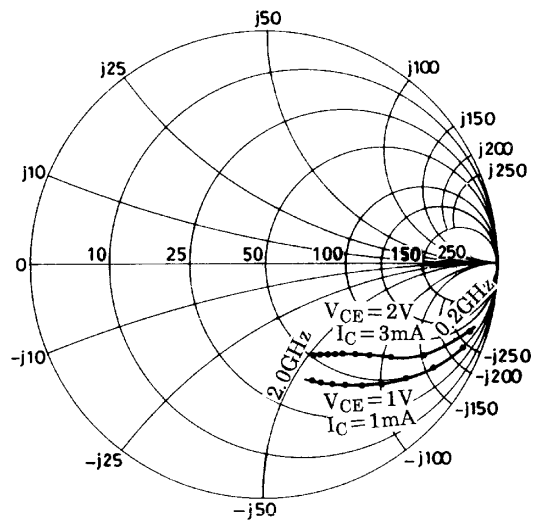
S21e
f = 200 to 2000MHz (200MHz step)



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



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



S parameter (Common emitter)

$V_{CE}=1V, I_C=1mA, Z_0=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.940 | -17.9 | 3.228 | 159.6 | 0.058 | 77.1 | 0.972 | -12.2 |
| 400 | 0.863 | -33.7 | 2.983 | 143.7 | 0.107 | 66.6 | 0.914 | -22.7 |
| 600 | 0.778 | -48.0 | 2.732 | 129.9 | 0.145 | 58.1 | 0.844 | -31.7 |
| 800 | 0.698 | -60.5 | 2.469 | 117.7 | 0.173 | 50.9 | 0.773 | -39.6 |
| 1000 | 0.608 | -73.5 | 2.320 | 106.2 | 0.195 | 45.4 | 0.717 | -46.0 |
| 1200 | 0.546 | -84.7 | 2.106 | 96.3 | 0.210 | 40.9 | 0.668 | -51.7 |
| 1400 | 0.470 | -96.2 | 1.977 | 87.1 | 0.129 | 37.6 | 0.624 | -56.5 |
| 1600 | 0.418 | -106.4 | 1.826 | 78.8 | 0.224 | 35.3 | 0.590 | -60.6 |
| 1800 | 0.388 | -117.3 | 1.700 | 72.2 | 0.230 | 33.8 | 0.562 | -64.3 |
| 2000 | 0.354 | -127.0 | 1.615 | 65.9 | 0.234 | 32.9 | 0.546 | -67.5 |

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

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 200 | 0.839 | -30.6 | 7.428 | 149.3 | 0.050 | 71.4 | 0.916 | -18.3 |
| 400 | 0.672 | -53.7 | 6.016 | 128.5 | 0.083 | 60.6 | 0.778 | -30.2 |
| 600 | 0.536 | -71.7 | 4.908 | 113.6 | 0.105 | 55.1 | 0.672 | -37.1 |
| 800 | 0.431 | -85.7 | 4.073 | 101.9 | 0.121 | 52.5 | 0.597 | -41.9 |
| 1000 | 0.360 | -99.0 | 3.494 | 92.7 | 0.135 | 51.4 | 0.548 | -45.7 |
| 1200 | 0.310 | -111.4 | 3.033 | 84.4 | 0.150 | 50.9 | 0.514 | -49.2 |
| 1400 | 0.265 | -122.6 | 2.694 | 77.4 | 0.162 | 50.9 | 0.492 | -52.3 |
| 1600 | 0.242 | -134.7 | 2.422 | 70.9 | 0.175 | 51.0 | 0.475 | -55.6 |
| 1800 | 0.228 | -148.0 | 2.205 | 65.9 | 0.189 | 51.1 | 0.461 | -59.0 |
| 2000 | 0.217 | -157.2 | 2.061 | 60.8 | 0.205 | 51.0 | 0.456 | -61.8 |

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