Ordering number:EN4578A

NPN Epitaxial Planar Silicon Transistor

# 2SC4853

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

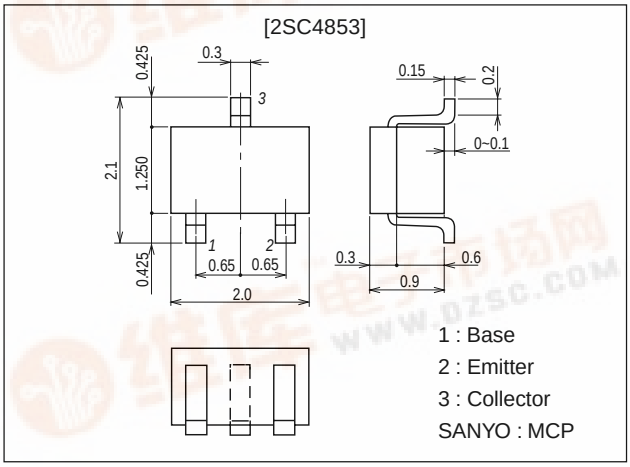
## Features

· Low-voltage, low-current operation : $f_T$=5GHz typ.
($V_{CE}$=1V, $I_C$=1mA) : $|S21e|^2$=7dB typ (f=1GHz).
: NF=2.6dB typ (f=1GHz).

## Package Dimensions

unit:mm

2059B




## Specifications

### Absolute Maximum Ratings at Ta = 25˚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 | Tj | | 150 | ˚C |
| Storage Temperature | Tstg | | –55 to +150 | ˚C |

### Electrical Characteristics at Ta = 25˚C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=5V, $I_E$=0 | | | 1.0 | μA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=1V, $I_C$=0 | | | 10 | μA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$=1V, $I_C$=1mA | 60* | | 270* | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=1V, $I_C$=1mA | | 5 | | GHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$=1V, f=1MHz | | 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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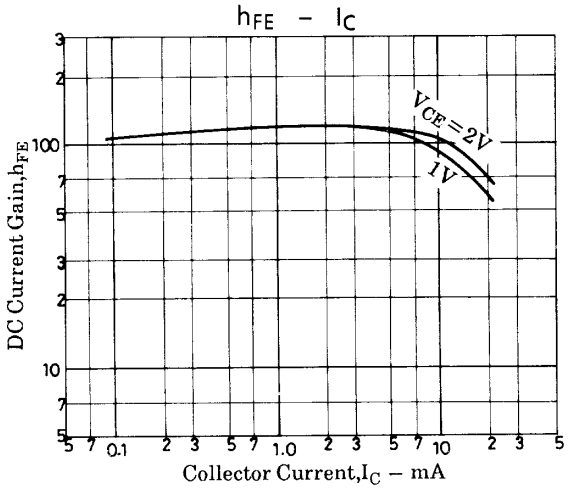
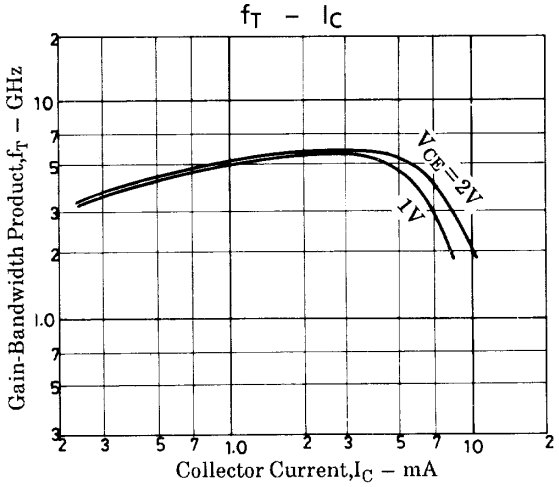
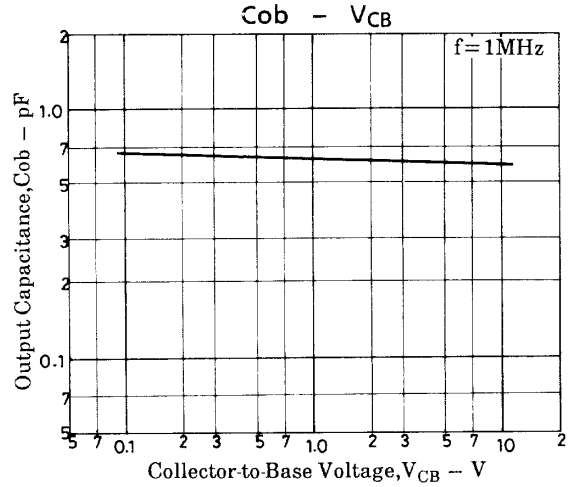
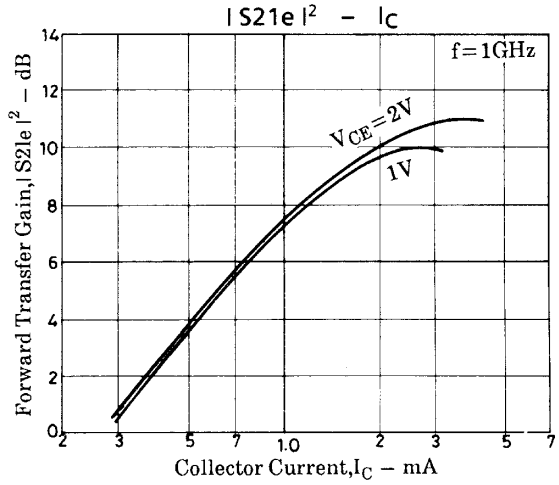
# 2SC4853

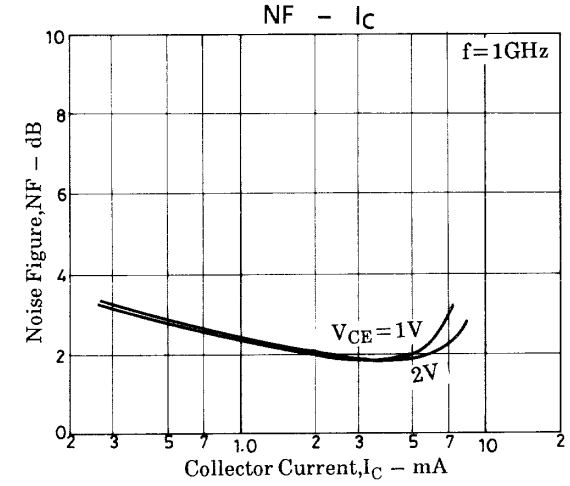
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Forward Transfer Gain | \| S21e \|$^2$ 1 | $V_{CE}$=1V, $I_C$=1mA, f=1GHz | 4.5 | 7 | | dB |
| | \| S21e \|$^2$ 2 | $V_{CE}$=2V, $I_C$=3mA, f=1GHz | | 10.5 | | dB |
| Noise Figure | NF1 | $V_{CE}$=1V, $I_C$=1mA, f=1GHz | | 2.6 | 4.5 | dB |
| | NF2 | $V_{CE}$=2V, $I_C$=3mA, f=1GHz | | 1.9 | | dB |

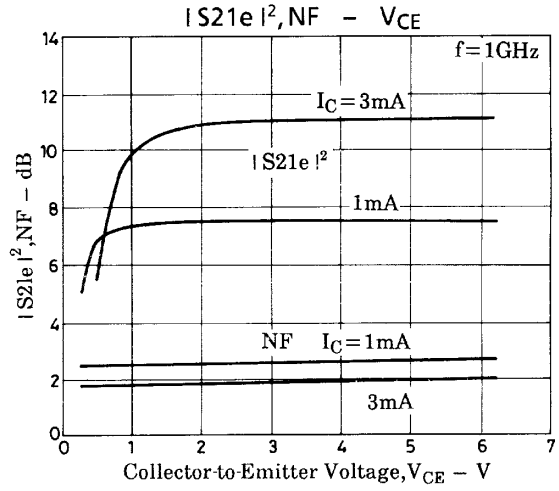


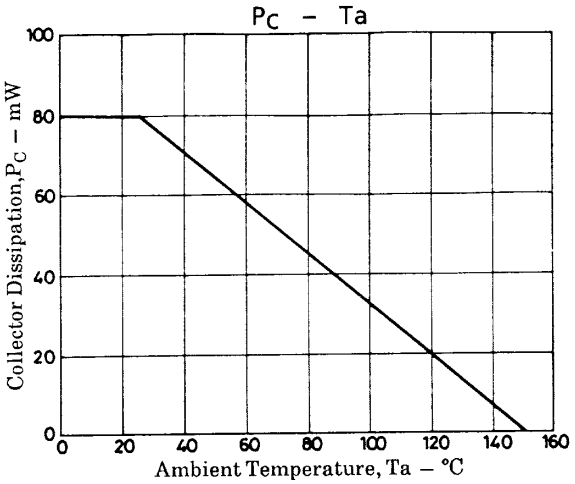



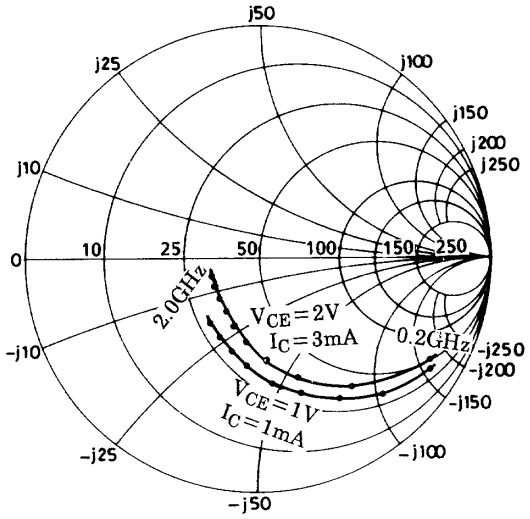



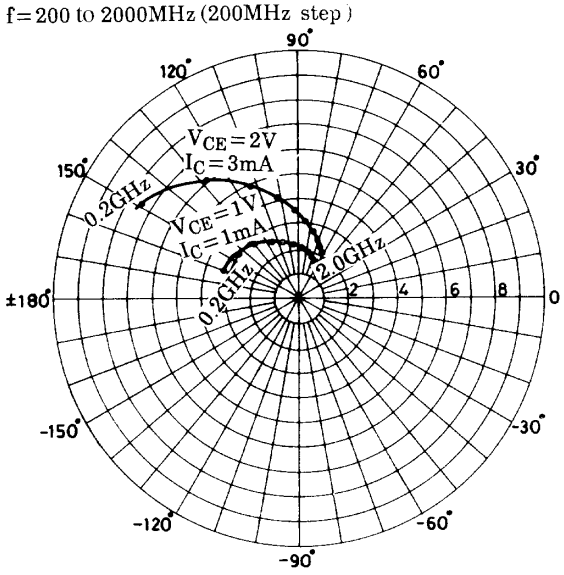



## S parameter

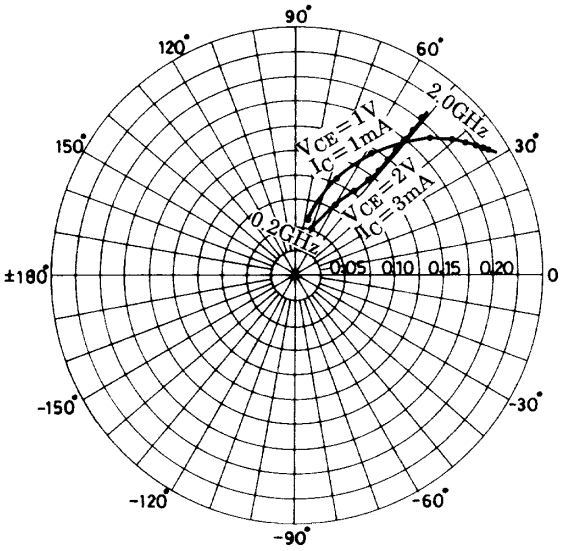
S11e
f=200 to 2000MHz (200MHz step)



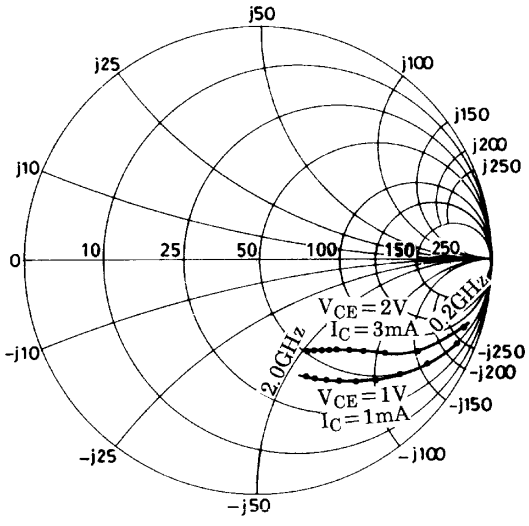

S21e
f=200 to 2000MHz (200MHz step)




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




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



## S parameter (Common emitter)

$V_{CE}$=1V, $I_C$=1mA, $Z_O$=50Ω

| 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, $Z_O$=50Ω

| 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 |